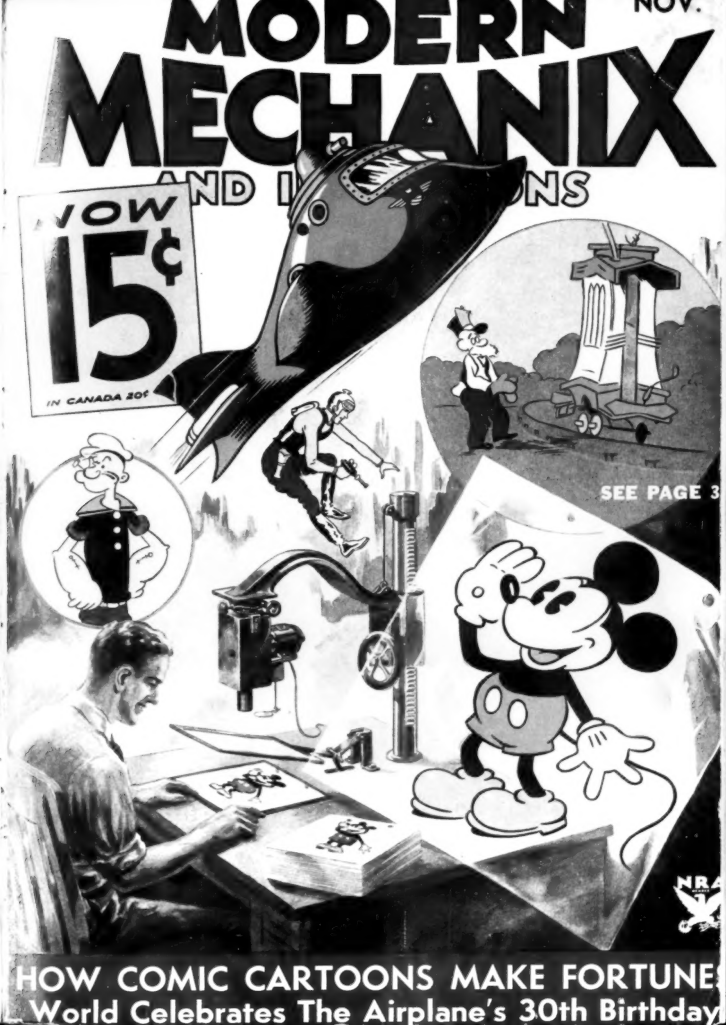
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NRA
HOW COMIC CARTOONS MAKE FORTUNES
World Celebrates The Airplane's 30th Birthday

Here is a Fascinating New Hobby!

Learn to Mount All Kinds of Birds and Animals

(Send the Coupon below for FREE BOOKLET)

This interesting and profitable hobby will bring you hours of delightful recreation

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Taxidermy is FUN and you can now learn it at home — by mail

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Send right now. **Today**, for full particulars as to how you can learn to become a Taxidermist—in your own home—using just your spare time.

TAXIDERMY CRAFT-WORK

You'll learn to make beautiful articles like those shown to the left **Using Real Birds and Animals.** The book-ends, pen set, lighter and reading-lamp illustrated here are only a few of the hundreds of **Useful** things you can make right at your own work bench. These articles make unique decorations for your own home or den, and **Sell Readily** to others, particularly sportsmen, teachers, and outdoor lovers. Too, you can use the most common of specimens, such as squirrels, rabbits, owls, pigeons, and even frogs. **You'll find this one** of the most interesting and fascinating hobbies you have ever undertaken.

Save Those Beautiful Trophies

The next time you go hunting or fishing, don't throw away your finest specimens. Mount them exactly as they were when alive, and decorate your home or den with these beautiful trophies. A knowledge of Taxidermy will double your interest in your hunting trips. Whether it is a pheasant, duck, game-bird or fish, we will show you how to re-create it exactly as it was when alive. All the secrets of the professional Taxidermist are now revealed; you'll learn **every** branch of the work, including the Craft-work described above, the mounting of game birds and animals, fish, game-heads, rodents and skulls, tanning, collecting insects, and other interesting branches. Also, you'll learn to **tan and dress skins, and make buckskin and leather.**

$25 TO $50 A WEEK IN YOUR SPARE TIME

If you want to make more money in your spare time, or add to your present income, then **investigate this uncrowded field.** You **can** make good money, either by making and selling the craft-work pieces shown in our article, or by **Mounting Game Specimens for Hunters and Fishermen.** With shortened hunting seasons, and reduced bag-limits, the **demand** for Taxidermy work is increasing enormously. **You** can provide this service for sportsmen in your community, and easily make enough to pay for the instruction while you are learning. Then in your spare time you can make from $25 to $50 a week. As a full time business, profits of $4000 a year are not unusual.

An Old Reliable School

Remember, this school has been in constant operation for 30 years, during which time we have graduated over 200,000 enthusiastic students. We teach just One Thing—Taxidermy. Our own Taxidermy shops have turned out jobs for some of the biggest museums in the world. Foreign governments and famous men have been our clients. We Know We Can Teach You to Become a Successful Taxidermy Artist. The work is highly interesting, it is Profitable. Make up your mind Right Now to investigate.

Read These Letters

Excerpts from a few recent students' letters.

"Since enrolling I have made over $200. Your instructions are very clear." C. Williams (West Va.).

"I mounted my first specimen within a week after receiving the first lesson." Ralph Hughes (Pa.).

"Work is coming faster all the time. In my first year I cleared $2000." F. S. Morris (N. Y.).

"Thanks to your lessons, I now own my hunting trophies. The lessons are clear and I find Taxidermy interesting and profitable." Joseph Kamm (Calif.).

Send Coupon for FREE BOOK

Or a LETTER OR POST CARD will do. The beautiful book will be sent FREE by return mail. The book tells all about this beautiful work, and how **YOU** can become an expert taxidermist. It contains over 200 fascinating pictures. Send for **YOUR** copy **TODAY** —send letter, post card or COUPON. Grasp this opportunity—SEND NOW. Please state your AGE.

FREE BOOK COUPON

Northwestern School of Taxidermy
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Send me your free Illustrated book, "How to Mount Game." Also tell me how I may learn this fascinating art easily and quickly by mail. No obligation.

Name .....

Age..... Address .....

Northwestern School of Taxidermy
4738 Elwood Bldg. Omaha, Nebr.

Learn how to plan and build your own model railroad system

Get this big fascinating new 52-page 1933 LIONEL Railroad Planning Book . . . FREE AT YOUR DEALER'S.

If you want to enjoy the most fascinating hobby any man or boy can have, get this big, new, gorgeously illustrated 52-page Lionel Model Railroad Planning Book. It tells you (1) *how to plan and lay out a miniature railroad system* and (2) *what to get to make it true to life to the last detail.*

No other book can give you what this new 1933 Lionel Model Railroad Planning Book does. It offers you a dozen different track layout combinations to build; it shows you the latest switches, signal towers, bridges, tunnels, semaphore systems — in fact everything you need to make a model railroad. It shows how you can start with a few feet of single track, a locomotive and several cars and then gradually add to your equipment until you have a great four-track system with batteries of powerful locomotives hauling great strings of freight cars, coal cars, gondolas and cabooses.

***How to get your copy* FREE**

Go to any department store, hardware, electrical, toy or sporting goods store that is authorized to sell Lionel Electric Trains and accessories. Here, at one of these Lionel dealers you can get your copy of this handsome, expensive book, *absolutely free.*

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They Told Him Salesmen Were "Born"

But Now He Makes $6,000 a Year

Thanks to These Two Free Books

IT WAS just two little free books that showed Ed Pinkham that he could be different from the rest of the men in our shop. Nobody ever imagined that Ed would land, even in the $5,000-a-year class, let alone be making $6,000 before he was thirty. Ed didn't know himself the abilities he had in him as a money-maker.

But one day, a strange occurrence changed his whole life. During his lunch hour Ed started to read a little book he had brought to work with him.

"It's a book called 'The Key to Master Salesmanship,' Bill," he told me. "It's the most amazing thing I ever read. I got it, and this other book, 'Mistakes Commonly Made In Selling,' free, just by writing for them. I never dreamed there was so much in salesmanship. You ought to send for your own copies."

"Huh!" said Luke Jones. "Do these books tell you how to become a salesman?"

"They sure do," replied Ed, enthusiastically.

"Don't waste your time," advised Luke. "You can't learn how to be a salesman. A fellow has to be 'born' that way to be a good salesman."

Ed just smiled at that, but he said nothing. Soon afterward he quit the shop, and we forgot about him. And then last night, I met Ed again—driving a snappy new sedan and dressed like a million dollars.

"For Pete's sake," I said. "What are you doing nowadays, Ed?" He smiled. "City sales manager for the Steel Castings Company," he told me. "What are you doing?"

"Still at the shop," I replied. "But what I want to know is, how do you come to be sales manager for Steel Castings? They're one of the biggest firms in the business."

Ed smiled again. "Remember those free books on Salesmanship that Luke Jones was kidding me about one day? Well, when I finished my Salesmanship training the Association I took it from gave me a choice of a number of jobs through their Free Employment Department, and I took a position as salesman for Steel Castings Company. They made me City Sales Manager three months ago at six thousand dollars a year."

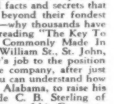
"Good night!" I said. "And Luke and I are still punching the old time clock!"

Ed looked at me seriously. "See here, Bill," he said. "Are you sport enough to risk three cents that you can do as well as I did? Then spend the three cents to write to the National Salesmen's Training Association tonight and get their free books. Then take their course. When you are qualified, their Free Employment Department will help you get a good sales job. Not only will they help you get the job but they agree under an iron-clad money-back penalty that you must be satisfied with the training received—or they refund your tuition!"

FREE—TO EVERY MAN

Two books—but such books! Just seven ounces apiece of paper and printer's ink—yet they reveal facts and secrets that have led hundreds of men to success beyond their fondest expectations! See for yourself—FREE—why thousands have increased their earning capacities, after reading "The Key To Master Salesmanship," and "Mistakes Commonly Made In Selling." A. L. Galbraith of 80 Prince William St., St. John, N. B., Canada, went from a bank teller's job to the position of branch manager of a large insurance company, after just one of these books opened his eyes. You can understand how it helped A. A. Fidler, of Montgomery, Alabama, to raise his pay 700%. You'll know how it made C. B. Sterling of Boldman, Kentucky, an officer and manager of his Company, raising his pay to ten times what it was. Learn for yourself the REAL TRUTH about salesmanship. You do not risk one penny nor incur the slightest obligation. And since it may prove the turning point in your career it is certainly worth your while to fill out and mail the coupon below. Do it now!

NATIONAL SALESMEN'S TRAINING ASSOCIATION, Dept. S-706, N. S. T. A. Bldg., Chicago, Ill.



Where Shall We Send Your Copies FREE

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Without cost or obligation please send me my free copies of "The Key To Master Salesmanship," and "Mistakes Commonly Made In Selling," including details of your FREE EMPLOYMENT Service.

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Age ..... Occupation .....

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MODERN MECHANIX AND INVENTIONS

Donald G. Cooley
EDITOR

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Volume XI | NOVEMBER, 1933 | Number 1

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Published monthly by Modern Mechanix Publishing Co., 529 So. 7th St., Minneapolis, Minn., U.S.A. Entered as Second Class matter Sept. 20th, 1928, at Minneapolis, Minn. Copyright 1933. Advertising offices Chicago, 35 E. Wacker Drive; New York, 52 Vanderbilt Ave. Printed in U.S.A.

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EDITED BY EXPERTS

Listed here are the members of the Modern Mechanix Board of Editors, all qualified by national repute to serve as authorities. They will gladly answer questions from readers if stamped envelope is sent. Address them in care of this magazine, 529 S. 7th St., Minneapolis, Minn.

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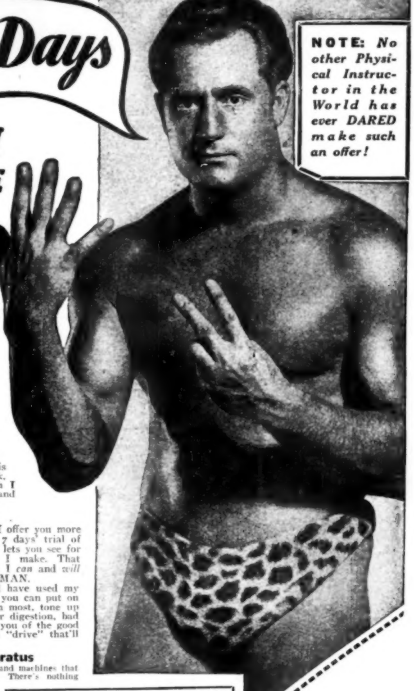
Just 7 Days

....that's all I need to PROVE I can make You a NEW MAN!

by Charles Atlas

Holder of the title: "The World's Most Perfectly Developed Man"



NOTE: *No other Physical Instructor in the World has ever DARED make such an offer!*

ONE week! That's all the time I need. In 7 days I'll PROVE that I can make you over into a *new man* of *vitality* and *power*.

I'll do for you exactly what I did for myself. I was once a 97-pound weakling. I was sickly, only half alive. I had a flabby, namby-pamby body.

How I changed myself from this "below average" physique into the man who won—against all comers—the title of "World's Most Perfectly Developed Man" is an absorbing story. It is told in my book, "Everlasting Health and Strength," which I will send you *absolutely free* if you fill in and mail the coupon below.

It's Easy MY WAY

Big *claims* mean nothing! That is why I offer you more than *promises*. That is why I offer you a 7 days' trial of my famous method, *Dynamic-Tension*. That lets you see for yourself that I back up every promise I make. That PROVES beyond a flicker of a doubt that I *can* and *will* turn you, too, into a vital, powerful NEW MAN.

Thousands of fellows all over the world have used my method—and now you can, too. Like them, you can put on firm layers of muscle where you need them most, tone up your whole system, banish constipation, poor digestion, bad breath, pimples and other ailments that rob you of the good things and good times of life, and get the "drive" that'll take you to the top of the ladder.

I've Got NO USE for Apparatus

I haven't any use for tricky weights or pulleys and machines that may strain your heart and other vital organs. There's nothing unnatural or artificial about this method of mine. And I don't dose you or doctor you. **Dynamic-Tension** is all I need. It's the natural, tested method for developing real men inside and out. It distributes added pounds of powerful muscles over your body, gets rid of ailments and surplus fat, and gives you the vitality, strength and pep that win you the admiration of every woman and the respect of any man.

Send for YOUR Copy of My FREE BOOK

Don't be held back by a below-par body! Now you can easily and quickly make this new man of yourself! Do what my thousands of other pupils did—send for a free copy of my illustrated book, "Everlasting Health and Strength." Learn how I built myself up from a weak, no-muscle, always-tired "runt" to winner of the title, "The World's Most Perfectly Developed Man." Gamble a stamp to mail my coupon—to learn how YOU can win the biggest prize in life—a handsome, healthy, husky body. Address CHARLES ATLAS, Dept. 6-11, 133 E. 23rd St., New York City.

FREE BOOK

Gamble a stamp today. Mail coupon for free copy of my new book, "Everlasting Health and Strength." It shows you from actual photos how I have developed my pupils to my own perfectly balanced proportions. Where shall I send your copy? Write your name and address plainly on the coupon. Mail it today to me personally.

CHARLES ATLAS,
Dept. 6-11
133 East 23rd Street,
New York City

I want proof that **Dynamic-Tension** will make a New Man of me—give me a healthy, husky body and big muscle development. Send free book, "Everlasting Health and Strength."

NAME.....
(Please print or write plainly)

ADDRESS.....

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Broadcasting Stations employ trained men continually for jobs paying up to $5,000 a year.

I WILL TRAIN YOU AT HOME

Many Make $40 $60 $75 a Week in Radio -- the Field With a Future

My book, "Rich Rewards in Radio," gives you information on the opportunities in Radio and explains how I train you quickly to become a Radio Expert through my practical Home Study training. It is free. Clip and mail the coupon NOW. Radio's amazing growth has made hundreds of fine jobs which pay $40, $60, $75 a week. Many of these jobs may quickly lead to salaries of $100 a week and more.

Radio—the field with a future

Ever so often a new business is started. You have seen how the men who got into the automobile, motion picture, and other industries when they were started had the first chance at the big jobs—the $5,000, $10,000, and $15,000 a year jobs. Radio offers the same chance that made men rich in those businesses. It has already made many Independent—will make many more wealthy in the future. You will be kicking yourself if you pass up this once-in-a-lifetime opportunity.

Police Departments are finding Radio a great aid in their work. Many good jobs have been made in this new field.

Many Radio Experts make $40-$60-$75 a week

In a few years 300,000 jobs have been made by Radio's growth. Thousands more will be made by its future development. Men with the right training—the kind of training I will give you in the N.R.I. Course—have stepped into Radio at 2and3 times their former salaries. Experienced service men as well as beginners praise N.R.I. training for what it has done for them.

Many make $5, $10, $15 a week extra in spare time almost at once

My course is world-famous as the one "that pays for itself." The day you enroll I send you instructions, which you should master quickly, for doing 28 Radio jobs common in most every neighborhood. Throughout your Course I will show you how to do other repair and service jobs on the side for extra money. I will not only show you how to do the jobs, but how to get them. I'll give you the plans and ideas that have made $200 to $1,000 a year for hundreds of fellows. G. W. Ware, 110 Raleigh Apts., Nashville, Tennessee, writes: "I made $935 in my spare time while taking your Course."

Spare time set servicing pays many N. R. I. men $5, $10, $15 a week extra. Full time men make as much as $40, $60, $75 a week.

Get ready for jobs like these

Broadcasting stations use engineers, operators, station managers and pay up to $5,000 a year. Radio manufacturers employ testers, inspectors, foremen, engineers, servicemen, for jobs paying up to $7,500 a year.

Radio Factories—Employ testers, inspectors, foremen, engineers, servicemen, for jobs paying up to $7,500 a year.

Television—the coming field of many great opportunities—is covered by my course.

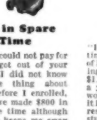
28 MONEY MAKING HINTS FREE

Mail the coupon. I'll send you one copy of my valuable 56-page Reference Book, "28 Tested Ways to Make Extra Money". I'll do it to prove that my training is easy to understand and use—that it is practical—that it is full of money-making information right from the start. This book shows you how to do 28 Radio jobs common in every neighborhood—tells you how to get these jobs. Hundreds of my students have made $5, $10, $15 a week in spare time while learning. Prove to yourself that you can do it too. Mail coupon.

I HAVE STARTED MANY IN RADIO AT 2 AND 3 TIMES

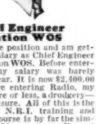
$400 Each Month

"I spent fifteen years as traveling salesman and was making good money but could see the opportunities in Radio. Believe me I am not sorry, for I have made more money than ever before. I have made more than $400 each month and it really was your course that brought me to this. I can't say too much for your school." J. G. Dahlstead, Radio Station KYA, San Francisco, Cal.



$800 in Spare Time

"Money could not pay for what I got out of your course. I did not know a single thing about Radio before I enrolled, but I have made $800 in my spare time although my work keeps me away from home from 6:00 A. M. to 7:00 P. M. Every word I ever read about your course I have found true." Milton I. Leiby, Jr., Topton, Pa.



Chief Engineer Station WOS

"I have a nice position and am getting a good salary as Chief Engineer of Radio Station WOS. Before entering Radio my salary was barely $1,000.00 a year. It is now $2,000.00 a year. Before entering Radio, my work was, more or less, a drudgery—it is now a pleasure. All of this is the result of the N.R.I. training and study. Your course is by far the simplest, clearest I have yet seen. You got me my first important position. After I accepted this position a number of others were offered to me as the result of the efforts of your Employment Service." H. H. Lance, Radio Station WOS, Jefferson City, Mo.

TO BE A RADIO EXPERT

Act Now --- Mail Coupon Below for Free Book of Facts and Proof

spectors, foremen, engineers, service men, buyers, and managers for jobs paying up to $7,500 a year. Radio dealers, jobbers (there are over 35,000) employ service men, salesmen, buyers, managers and pay up to $100 a week. There are hundreds of opportunities to have a spare time or full time Radio business of your own. I'll show you how to start your own business on money made in spare time while learning. My book tells you of other opportunities.

You can learn at home in your spare time to be a Radio Expert

Hold your job. There is no need for you to leave home. I will train you quickly and inexpensively during your spare time. You don't have to be a high school or college graduate. My Course is written in a clear, interesting style that most anyone can grasp. I give you practical experience under my 50-50 method of training—one-half from lesson books and one-half from practical experiments with equipment given without extra charge. It makes learning at home easy, fascinating, practical.

Television, Short Wave, Public Address Systems Included

There's opportunity for you in Radio. Its future is certain. Television, short-wave, public address systems, police Radio, automobile Radio, aircraft Radio—in every branch, developments and improvements are taking place. Here is a real future for thousands and thousands of men who really know Radio—men with N. R. I. training. Get the training that opens the road to good pay and success.

Your money back if you are not satisfied

I will give you an agreement in writing, legal and binding upon this Institute, to refund every penny of your money upon completing my Course if you are not satisfied with my Lessons and Instruction Service. The resources of the National Radio Institute, Pioneer and World's Largest Home-Study Radio School, stand behind this agreement.

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J. E. SMITH, President
Dept. 3-MH, National Radio Institute, Washington, D. C.

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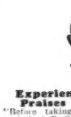

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International Correspondence Schools
Scranton, Penna.

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Just think of it. For a premium of only $1.00 per month you may have the protection of sound legal reserve life insurance backed by more than $21,000,000 in assets. Same premium for all ages—18 to 50 both men and women. The policy is written in exact conformity to the stringent insurance laws of New York, carries cash values, paid-up and extended insurance privileges. For this special offer it is modified to reduce the premiums to one-half of the premiums payable after five years.

Consult the table right in this advertisement and see how much insurance $1.00 per month will buy at your age. $2.00 will buy twice as much, etc. Then send the coupon below with the amount to cover your first month's premium. We have no agents. Postal sells only through the mail. You risk nothing. Your money will be refunded instantly if your application is not accepted. Do not delay another hour. Send the coupon below.

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22	1167	38	734
23	1140	39	708
24	1112	40	682
25	1085	41	657
26	1057	42	632
27	1030	43	607
28	1003	44	583
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We will send you this $15 Master Lathe for $9.80 which includes complete bed, Master bench-head, tail stock, tool rest with support, spur driver, 6" x ½" all-purpose grinding wheel and an endless V belt. Send $1—pay balance C.O.D. Write for booklet on other attachments.

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Thank You for Mentioning Modern Mechanix and Inventions for November When Writing to Advertisers

»ACCEPT Free Membership in the
MAGICIANS' LEAGUE *of* AMERICA — *and discover this..*

New "MAGIC WAY" *to* ...FUN *and* POPULARITY!

Amazing and mystifying feats of magic that YOU can do, now revealed in unique MAGICIAN'S MANUAL . . . Contains actual apparatus and complete step-by-step guidance for expert performance . . . Issued by The Magicians' League of America and *sent free to new members for five days' actual trial!*

ALWAYS INVITED—because he is ready on any occasion with this "magical talent" to entertain.

NOW *you* can perform amazing and mystifying feats of magic—hold an audience of any size spellbound and delighted—be "in demand" at parties, at the club, among business acquaintances and at business gatherings!

Now, through free membership and the unique new "Magician's Manual," The Magicians' League of America offers *mastery of magic*, reveals secrets of famous magicians, and shows how *you* can duplicate their applause-winning, seemingly-supernatural feats.

Magic at Your Command!

The mere outline given on this page can only *suggest* the tremendous scope and fascinating contents of the "Magician's Manual." Everything you need for quick mastery and expert performance is supplied—including *actual magical apparatus* mounted right on the pages with the crystal-clear instructions and illustrations that give step-by-step guidance.

First you are shown how to perform *over 100 separate feats of magic*. Then you are shown how to link these separate feats together to form programs and routines of any desired duration. In addition, you are told exactly when and which feats to perform for most effective presentation—which to perform at the dinner table; which at the card table; which to best at parties; which for impromptu performance. Specific "programs" are printed with directions for varying them to assure ever-new interest.

It's *fun in itself* to master magic with the aid of the "Magician's Manual." No tedious "studying" no tiresome "practicing." So complete, so easy to follow, *five minutes* after you get *your* copy you can perform your first feats of magic.

If you have ever wished for some unique accomplishment that would let you take an active and a leading part at gatherings of any kind, or to help you "put yourself across" when making new acquaintances—here is your opportunity to make your wish a reality!

CONTENTS—Introduction to Magic—Instruction in Magic: Tricks of Deception; Tricks with Cards; Tricks of Divination; Match Box Routine; String Routine—Programs and Presentation—Selected Magic: complete supplement of feats for new programs—Magical apparatus, ribbons, card and paper inserts, etc., etc.

ACTUAL SIZE: 7¼ in. wide by 10¼ in. deep.

MAGICIAN'S MANUAL — *Sent free for 5days' examination and trial!*

No Money Now—No C.O.D.

TO be enrolled as a member of The Magicians' League of America, and to receive the "Magician's Manual" free for five days' examination and trial, simply fill in and mail Form below. On receipt, make your own test of the "Manual's" ability to give you quick mastery of this popularity-winning talent. If you keep it, send only $1 in full payment; otherwise return it and owe nothing. Remember, you are under no membership duties or other obligations. Mail Form below to *The Magicians' League of America, (Dept. 511), 225 Fifth Avenue, New York, N. Y.*

MEMBERSHIP & FREE-EXAMINATION FORM

MAGICIANS' LEAGUE OF AMERICA, (Dept.511)
225 Fifth Avenue, New York, N. Y.

Enroll me as a member of The Magicians' League of America and send at once MY copy of the "Magician's Manual" for five days' free examination and actual trial. If I keep the "Manual" I will send only $1, in full payment. Otherwise I will return it and owe nothing. I understand there are no membership dues, or other charges, except for the "Manual." Send to

My Name .....

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Billy Press, of Delaware City, Delaware, built a Comedy Ford from M-M plans. A favorite stunt is to take a neophyte for a ride near a mud puddle, and "let 'er rare" up backwards into the soup. Right shows her imitating an elephant's walk.

Andy's Shop Mail Box

Our esteemed Greasemonk takes over the typemill this month to briefly exhibit a few choice letters he has been waiting to work off the spindle. Some pointers for engine fans are interlarded and a hint is given concerning future cargoes.

NEWS for my cash customers!

Yore ol' grease monk uncle has gone and bot himself another ship! Yessir: let me tell you—

A gent wrote in here saying he had a thousand dollars for a good used airplane. What should he do with it?

"Wire me every five minutes, collect, until I get there," I flashed him. Off, up and away, and the old Moth is now no more. The dollars have been planted to an Aeronca—a C-2 like Dave Meeker has (see last issue) and I am at last settled down to light airplane bliss, after having flown everything brought my way by an admiring public for the last five years.

Automobile reliability, snooze-proof engine, and plenty of heft in materials in the right place gimme something at last to know why I have flown near-beer angel makers so long. And what fun it is to thumb my ugly snout at the horizon in the general direction of Washington and the boys who have tried to kill the lightplane racket.

* * *

The various and sundry eds who draw down regular pay checks for putting in fairly regular hours in the editorial sanctum of this grand old family almanac whispered that *Tahiti* is finally with us. A famed ship, she, by an equally notorious limner of seagoing yachts. Jack Hanna has done a swell job as you can see by this and subsequent issues. Geev it a look. But don't write and ask me what you can change.

A man who'd alter this design one iota is a lubber. I don't write to lubbers. Neither does Jack.

* * *

This issue is a break for the boaters and fliers and home handicraftsmen who have been missing their "roast beef" lately. Make the most of it while it lasts, men. But don't gorge yourselves. We may be back on simple fare next month.

* * *

Midget cars gain in popularity. You ought to see what we have in store for the Knights of the Wheel. Just keep watchin'.

* * *

Just to give you an inkling, Dick Roth of The Dalles, Ore., has sent me this letter. It indicates the interest in speed bugs with wheels under 'em.

Dear Andy:

Am sending you a couple snaps of my model T my brother and I built. It has a clearance of 4½" at the oil drain and we made the under-sling irons in front out of ¼" boiler plating and the back irons out of ¼"x2½" strap irons. The front iron sets the top of the spring level with the top of the frame and 2" forward of the original position of the axle. The back irons sets the frame down level with the back ax. The radius rods are fastened to the frame as in photo. That is the under-sling dope.

Now for the power plant and running gear. We have a 26 motor with the head shaved down and a couple layers of the gasket removed. We put an inch and a quarter down-draft Windfield carb and a 2¼ racing gear in the diff. all of these give the crate a speed of 70 M.P.H. or better, and it don't bounce around at that speed either. The exhaust comes out the front of the motor and down the side as in illustration, both manifolds are inverted. The steering gear is made up of Chev drive shaft and housed in a Chev torque tube with a Ford universal at the fire wall. The fire wall is made of ¼" boiler plating as

are the floor boards. The body is made of ¼x1 strap iron with the joints welded together and covered with black sheet iron. The radiator is raised 2½". On the whole the buggy is solidly built.

Yours truly,
Richard Roth,

* * *

Scram continues to be as popular as ever. Thought I'd publish this'n to show what can be done by home builders. I imagine about a hundred of these boats have been built.

However, please be advised we have quit furnishing the parts for the model A conversions. Hank changed his models, the gear people changed theirs, and we can't afford to change a whole set of patterns every time a season rolls up. Address conversion inquiries to Johnston Marine Engine Co., Sandusky, Ohio, who are in a position to furnish these engines.

Dear Sir:

Received price list for motor conversion for scram. The initials I inquired about L.P.S. are at the bottom of page 135 in the June issue of M.M.&I.

How long will you be able to supply parts for the motor conversion? I don't think I can order before about October. Will you have all the parts then?

I did not have any grief fairing in the lines as I put the intermediate frames in before I started to plank and I think I saved myself a lot of work. I got a first class job out of it, looks like a new Chris Craft right from the factory. Thanks to you for your splendid design, but what is worrying me is—when I planked the boat I made each plank fit tight against the next one. Should I have left a little clearance or should they be fit tight? Where is the lumber going when it takes some water and swells? I used mahogany lumber for planking.

This Speedster Hails From Oregon

Richard Roth, of The Dalles, Ore., built this sweet looking little speedster from Model T parts and M-M suggestions.

Is the propeller shaft 1½" or ¼"? Can you tell me where I can get a stuffing box like shown in the plans?

I would like to hear from someone that built the scram who put in the intermediate frames after the planking was done.

Two of us built the scram in 28 days. Not bad, with all hand tools, is it?

If you will be kind enough to answer all my questions I promise I will not bother you until I send for my parts for the conversion.

Yours truly,
Russell Patterson,
Cincinnati, Ohio.

Nice going, Mr. Patterson. Twenty-eight days is a mighty fine showing for putting this boat together.

* * *

And then, while on the subject of boats, see what Bill Hood did in the cruiser line with our plans of Gannet, which he (wisely) built right to the letter.

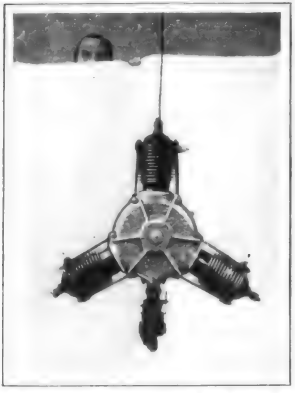
Birmingham, Ala.

Dear Sirs:

I have just successfully completed the

Bill Hood, down in Bummin'ham, built this verbatim version of Chas. Hall's Gannet design, published in "How to Build Twenty Boats." The whole job, motor and all, cost only five hundred dollars, and Bill is very pleased.

M-M Reader Sponsors Famed Motor



We believe the gentleman retiring behind the screen is none other than Henry Lowe Brownback, famed designer of the Brownback Y motor. Flyer, naval architect and engineer, Brownback has some interesting things to say in this column.

"Gannet" as is shown in your magazine. She is a beautiful job and performs beautifully with a very simply converted Ford Model A Motor. The craft has everything from a stove to a mahogany cabin and cost only $500.

I had never seen a boat of this style before much less built one but being a graduate in Mechanical Engineering and having two good friends we built her "as she has never been built before."

I intend to tell and show just how anybody regardless of skill and tools, can build this fine cabin cruiser very cheaply and with only ten dollars worth of hand tools. I think our Ford conversion will be of interest also, since it is quite unusual, but performs surprisingly well.

I feel quite certain that if more people knew that they could build a fine boat made of the best of materials as cheap as four or five hundred that the sale of your "How to Build 20 Boats" would certainly jump.

Sincerely,

Wm. E. Hood.

• • •

Wayne Winters, 31 Park Circle, Council Bluffs, Iowa, has a flock of used cycle and cycle car motors. Tell him your needs.

Manueal Ryes, 101 E. Main, San Gabriel, Cal., wants a used Harley motor. Got any?

Stanley Pasturczak, 1512 6th Ave., East Moline, Ill., is another looking for a used cycle engine.

—And can we ever put somebody in touch with somebody, providing somebody has one, two or ten good used Smith motorwheels!

Just had to get the above out of my system to save a lot of annoying letters.

• • •

A man who knows his engineering drops me a line. I let his letter stand:

Gentlemen:

I was much interested to see the cover and read the boat description in a recent issue. Please read the enclosed patent copies and return them. By building a boat having a wide beam, yet in good planing proportion one can lift approximately the weight of the power plant, providing light weight engines are used. Careful calculation will show then speeds in excess of those now being attained are certain. I have been so busy with my airplane engine development that I have had little time to give to boats during the past several years but hope to have more shortly and to build several experimental hulls either here or in France where I spend much of my time.

I read your Flying Manual with much interest and many of the solutions you present are most interesting. Some of them fly directly in the face of my designing experience, dating from 1913, but then I may be wrong and I enjoy seeing what the men who cater to the home made element are doing. I am hoping that some day the Government will confine its dictatorship to air transport only and let private flying develop in the hands of some of the very competent engineers in the industry who are certainly as capable as the Government engineers and realize just as thoroughly that any airplane or engine which is even unreliable to a minor degree even though not dangerous will soon die a natural death and put them out of business.

If the Government were to regulate the design of motor cars, trucks, busses, boats, locomotives and trolley cars in the same dictatorial manner in which they are regulating the design of small aircraft the crowds would still turn out to see what a motor car looks like. Were we to have or get someone less broad-minded at the head of the Government activities than Clarence Young we might as well fold up our tents and go home.

Yours very truly,

Henry Lowe Brownback.

• • •

Just before I close in a fadeout for the month, I can't help spouting these oddz and endz: Anyone having a used Austin motor will confer a treat on the Hangar Gang by getting in touch with me. I have a surprise to spring, built around one sech motor. Willing to buy it, too!

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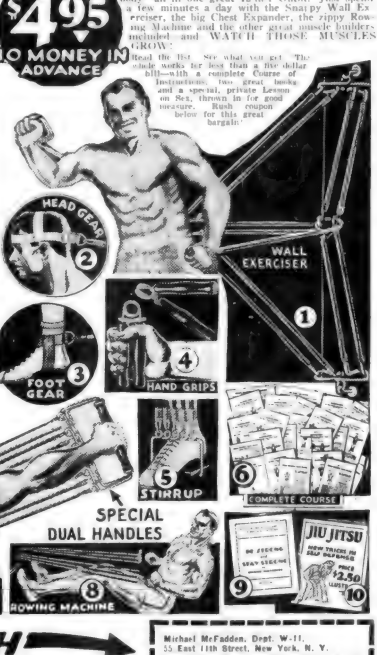

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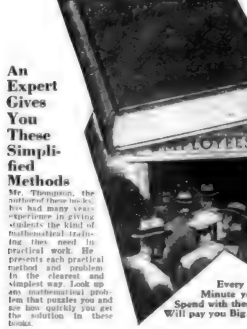

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Explanations of Nic Sprank's Oddities of Science on Page 58

Who would believe at first thought that the atomic energy imprisoned in half a glass of water would equal the energy of two 100 ton locomotives colliding at full speed. Yet it's true, as James Baysinger, of Cayuga, Indiana, says. Scientists have been conducting extensive experiments to unlock the energy contained in a drop of water, but to date they have not succeeded on a practical scale.

It is commonly believed an uppercut to the "button" sends the boxer down for the count, but such is not the case, as Sol. Chaney, 335 E. 204 St., Fordham, N. Y., says. It's the impact to the inner ear, where is located the organ of equilibrium. The sock on the jaw is transmitted to this organ, destroying the fighter's balance so that he loses his balance and "kisses the canvas."

Joseph L. Kamber, of Manchester Depot, Vermont, contributes the oddity that gasoline will put out a fire. The explanation is that combustion is the chemical union of oxygen with some other substance. Therefore, since no oxygen is present combustion cannot take place.

You might find it difficult to believe this, but people who drown seldom have water in their lungs, as Justine Teichman states. The cause of the death lies in the fact that the water usually clogs up the air passages, so that the victim dies of suffocation.

Hatching eggs in a refrigerator is a feat accomplished by Mrs. R. W. Ziebell, of Arnold, Minnesota. A kerosene lamp was set in compartment usually used for ice.

If you are ever caught at the North Pole without a match, here is how you can start a fire. Obtain a clear slab of ice and shape it into the form of a magnifying glass. Ice so shaped possesses much the same qualities of a piece of glass of the same form, so you can concentrate the sun's rays on a bit of tinder and set it afire.

Spectators at the Schneider Seaplane Trophy Races learn something new about the relative speeds of sound and sight. They watch the plane rocket by but not till it is out of sight do they hear the roar of the motor. The reason is sound travels much slower than 426 m. p. h.

In certain sections of China, house cats are used to tell the time of day. As is generally known, the pupils of the cat's eyes contract and expand during the day. The Chinese become so expert at observing the degree of dilation of a cat's eyes that they can tell time more accurately than an expensive watch.

Lieut. Don Benn Owens, Jr., who contributes the above item, also claims that he has seen many rattlers, even when enraged to the point of attack, place themselves in a listening posture and continue immovably attentive during the serenade.

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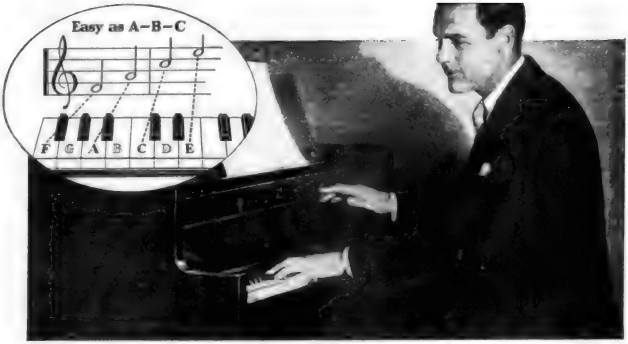

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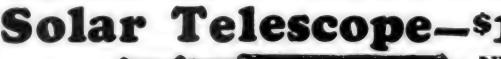

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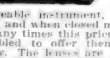

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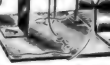

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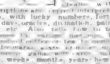

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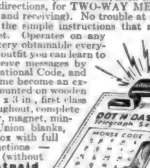

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Try this Midwest radio... in your own home... for thirty days before you decide. See for yourself the 40 new 1934 features that insure amazing performance. For example—Automatic SELECT-O-BAND (exclusive with Midwest), simplifies short wave tuning, instantly pointing out the wave length of the station. Other features include: Amplified Automatic Volume Control, New Type Tubes, 16 Tubes, Balanced Unit Superheterodyne Circuit, Velvety Action Tuning, Super Power Class "A" Amplifier, 29 Tuned Circuits, New Duplex-Diode-High Mu Pentode Tubes, No-Image Heterodynes, Full Rubber Floated Chassis, Variable Tone Blender, Centralized Tuning, 7 KC Selectivity, New Thermionic Rectifier, Totally scientific shielded (coils and switch catacombed), etc. These features are usually found only in sets selling from $100 to $150.

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MODERN MECHANIX

LATEST SCIENTIFIC

James R. (Jimmy) Wedell, new land plane speed king, climbing from cockpit of his Wedell-Williams special after whizzing through the air 305.3 m.p.h., bettering Doolittle's record 11 m.p.h.

Devised to enable airplanes to land on top of buildings, this new invention circles about to permit plane to hook on and be drawn in to landing.

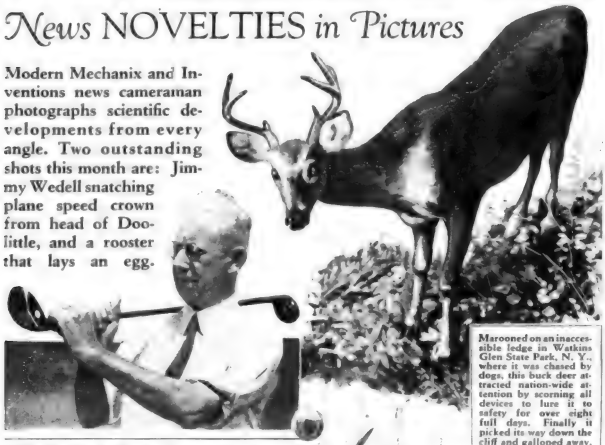
Latest mechanical aid for prize fights is this automatic clock which sounds gongs to time rounds, keeps count of rounds and shows seconds boxer is down after a telling punch.

Strangest of Mother Nature's freaks is this rooster that actually lays an egg and then crows about it. Owned by Mr. J. Jeffries, of Berkeley, Calif., the bird is otherwise all male.

AND INVENTIONS

News NOVELTIES in Pictures

Modern Mechanix and Inventions news cameraman photographs scientific developments from every angle. Two outstanding shots this month are: Jimmy Wedell snatching plane speed crown from head of Doolittle, and a rooster that lays an egg.



Marooned on an inaccessible ledge in Watkins Glen State Park, N. Y., where it was chased by dogs, this buck deer attracted nation-wide attention by scorning all devices to lure it to safety for over eight full days. Finally it picked its way down the cliff and galloped away.

This "Golf Club of the Future," has a driver on one end and a spoon on the other; cures hooks and slices.

Inflation hits ping-pong. Here a bevy of bathing beauties are wielding overgrown paddles to swat an oversize ball in a spirited game on top of the famous ship cafe at Venice, California. The floor dimensions and net are enlarged in proportion to paddles and ball.

How Comic CARTOONS

THE BIG MONEY MAKERS OF THE FUNNIES		
Cartoonist	Name of Cartoon	W'kly Income
Robert L. Ripley	Believe It or Not	$7,000
Sidney Smith	The Gumps	3,000
Bud Fisher	Mutt & Jeff	1,800
George McManus	Bringing Up Father	1,800
Fontaine Fox	Toonerville Topics	1,500
Sol Hess	The Nebbs	1,200

The "funnies" you read every day bring $8,000,000 a year to a small group of 200 cartoonists. How they rose to the top and how you can enter their select circle is told here by leading comic artists.

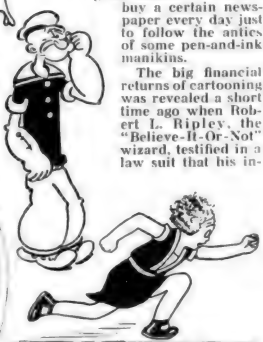
THAT laugh you had today over your favorite funny strip is worth money—$200 to $1,000 a day to the cartoonist that made you chuckle.

His pen and ink characters are part of a great $8,000,000 industry that is far from overcrowded and that is practically depression proof.

Of the 200 successful cartoonists today the majority were not "born artists." In many cases they were not artists at all, but just fellows with a knack for sketching who thought of a good idea or a funny character that "made a hit" with an editor and eventually with newspaper readers.

Today editors are eagerly looking for more cartoonists with better ideas or funnier cartoons. It has been proved that dad, mother, brother, sister, the bootblack and the millionaire—nearly everyone—reads the "funnies" and that a great number of readers buy a certain newspaper every day just to follow the antics of some pen-and-ink manikins.

The big financial returns of cartooning was revealed a short time ago when Robert L. Ripley, the "Believe-It-Or-Not" wizard, testified in a law suit that his in-



Robert L. Ripley (left) earns more than $350,000 a year because he ran out of ideas one day. Looking through a sports record book, he found some amazing facts, and produced the first "Believe It or Not" cartoon. At the top left is one of Ripley's drawings. To the right of it is Jiggs of "Bringing Up Father" which has brought a fortune to George McManus. E. C. Segar's hard boiled "Pop-eye, the Sailorman," is one of the new popular comic strips. Below him is "Little Orphan Annie," whose adventures bring $1,600 a week to Harold Gras

Make Fortunes

by ALFRED ALBELLI

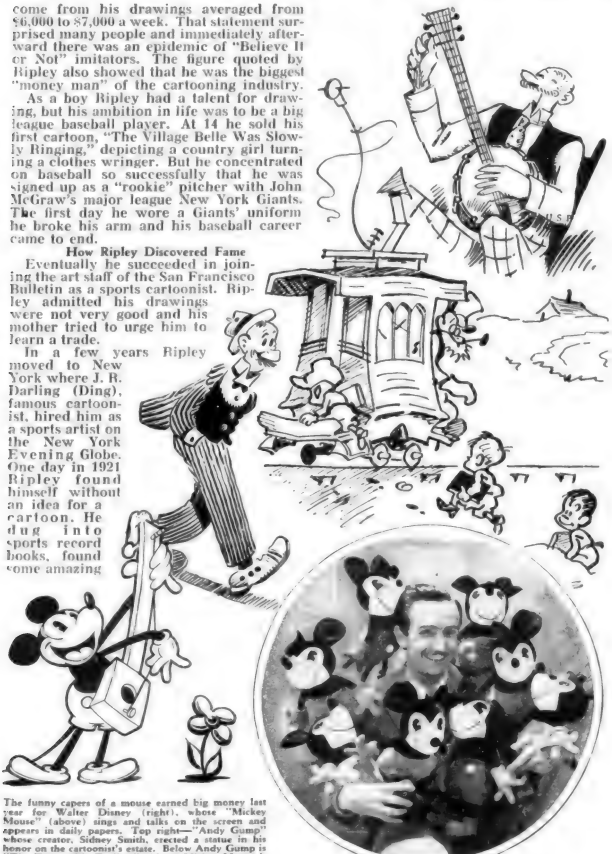
come from his drawings averaged from $6,000 to $7,000 a week. That statement surprised many people and immediately afterward there was an epidemic of "Believe It or Not" imitators. The figure quoted by Ripley also showed that he was the biggest "money man" of the cartooning industry.

As a boy Ripley had a talent for drawing, but his ambition in life was to be a big league baseball player. At 14 he sold his first cartoon, "The Village Belle Was Slowly Ringing," depicting a country girl turning a clothes wringer. But he concentrated on baseball so successfully that he was signed up as a "rookie" pitcher with John McGraw's major league New York Giants. The first day he wore a Giants' uniform he broke his arm and his baseball career came to end.

How Ripley Discovered Fame

Eventually he succeeded in joining the art staff of the San Francisco Bulletin as a sports cartoonist. Ripley admitted his drawings were not very good and his mother tried to urge him to learn a trade.

In a few years Ripley moved to New York where J. R. Darling (Ding), famous cartoonist, hired him as a sports artist on the New York Evening Globe. One day in 1921 Ripley found himself without an idea for a cartoon. He dug into sports record books, found some amazing



The funny capers of a mouse earned big money last year for Walter Disney (right), whose "Mickey Mouse" (above) sings and talks on the screen and appears in daily papers. Top right—"Andy Gump" whose creator, Sidney Smith, erected a statue in his honor on the cartoonist's estate. Below Andy Gump is "The Toonerville Trolley." Above Mickey Mouse is Mutt of the "Mutt and Jeff" team by Bud Fisher.

Rube Goldberg (above) started out to be a mining engineer but found more fun—and money—in drawing looney inventions, "Boob McNutt" and "That's Life." At right is a drawing from his "That's Life" strip, successfully launched during the depression.

performances, pictured them and turned them over to the chief of the art staff. The title "Believe It or Not" was put on the drawing.

The cartoon proved so popular that he had to continue the "Believe It or Not" drawings daily. Other papers in different cities wanted the cartoons and Ripley became a syndicate cartoonist with a rapidly increasing income. In 1929 he signed a contract with William Randolph Hearst's King Features syndicate. His drawings now appear in more than 250 newspapers in the United States, Canada, and twenty-two foreign countries. During 1932 Ripley traveled 60,000 miles and this year 30,000 miles seeking the unusual facts he pictures daily. To date he has visited 151 different countries.

The Leading Comic Artists

Ripley, though, does not draw "funnies." Of the comic strip type of cartoonist, Sidney Smith, creator of the buffooning Andy Gump, George McManus and his "Bringing Up Father," and Bud Fisher with "Mutt and Jeff" easily are at the top. These three earn about $2,000 a week from their daily strips and possibly $1,000 more from other sources that use their comic characters. Last year Sidney Smith, Chicago Tribune newspaper syndicate's ace cartoonist, earned $150,000 from the Gump family's adventures.

Last year was the worst year of the depression but it affected cartooning very little compared to other industries. Why? Because editors wanted more and more "funnies" to cheer people and help them forget their troubles.

Funnies Started During Depression

The depression brought fortunes to several cartoonists. The adventurous exploits of Dick Tracy, square-jawed detective character created by Chester Gould, pitched the obscure Gould straight on his way into the $50,000-a-year class, within the short period of six months.

Rube Goldberg, leading cartoonist of the

Grant Powers (left), the highest paid sports cartoonist in New York City, in the accompanying article tells how to be a successful cartoonist. Many comic strip artists started drawing for the sports departments of newspapers. Above are a few of Powers' sketches.

McNaught Syndicate whose looney inventions make thousands laugh, also found more income during the depression. He started a new comic strip called "That's Life" that has become popular. Goldberg, by the way, started out to be a mining engineer. E. C. Segar's jaw smashing "Popeye" and Phil Nowlan's and Dick Calkins' "Buck Rogers," and Percy Crosby's "Skippy" have also made great strides in the last two or three years.

Movie Cartoons Highly Successful

These and other "funnies" have grown during the depression, but the old standbys, tried by many years of wear and tear, have clung to the top as popular as ever. Bud Fisher's "Mutt and Jeff," whose daily adventures are distributed by the Bell Syndicate, is still a great money maker. These two characters are the veterans of funnyland. Andy Gump first saw the light of the printed page in 1917, but Mutt and Jeff made their debut in 1909.

Another type of cartooning is the animated funnies of the movies, now equipped with voices and music just like all "talkies." Walt Disney, who has taken a mouse as his leading man and made "Mickey Mouse" a big hit throughout the world, is the leader of this field. His annual income, it is said, reaches astronomical figures. "Mickey Mouse" is also syndicated in daily newspapers by Walt Disney Enterprises.

Where do these expert comic masters who earn such big fortunes come from? How does one go about getting into this select golden circle?

You must have the knack or talent to draw cartoons, of course. Schools specialize in the art and turn out successful graduates. But there are thousands of cartoonists all over the country who are not making fortunes.

Then how does one get into this big money class? Grant Powers, well known New York sports cartoonist, supplied the answer.

Sidney Smith (above) would not have earned $150,000 last year if he had followed his father's advice to study dentistry. He quit school at 17, got a job at $35 a week as a staff artist on an Indianapolis newspaper and in 1917 started Andy Gump, shown at the left, on his very popular career.

"Mutt and Jeff" (above) are the veterans of the comic strips. Bud Fisher (right) created them in 1909 and since then they have been near the top of the most popular funnies. Fisher, who now lives on fashionable Park avenue, "millionaires row" in New York City, started in San Francisco drawing pictures for hat advertisements at 50 cents each.

From "Jiggs" to "Screen Oddities" Shows the Evolution of Cartooning

"An art school education or training in a school which majors in cartooning can do no harm," he said. "It may be of tremendous benefit in giving you the technique to polish up your natural talents.

"But I have known cartoonists with no previous training to volunteer to work for nothing so that they might assist their idols in lettering in balloons—which is the dialogue—or the background after the artist has done the principal work of the strip.

"Once you have made this contact, or obtained some other work in an office where cartoonists are at work, you must be very patient as sometimes months and years may roll by and the rainbow's end still be remote. But sooner or later every understudy gets his opportunity. Most conspicuous of these is the case of the man who inherited the 'Mr. and Mrs.' strip after the immortal Clare Briggs, its mentor, died. That feature continued running, uninterrupted by the passing of its creator, simply because there was a pinch-hitter on hand to carry on the work.

"When you have gained entree to a newspaper, you are quite likely to find that the sporting department can use a good feature from you once a week, preferably Sunday. At first it might be crude, finding appeal only in the fundamental fact that it is a cartoon. But if you've got the stuff, it will improve—or die.

"If you've got something unique, the publisher will ask you to make it a daily feature. If it goes over big as a daily feature, it will get abroad that you are producing something worthy of national recognition.

"At this point you make your first acquaintance with the syndicates, organizations which take your original product and have it reproduced several hundred times. They then sell the mats—a sort of paper mould from which plates are made in the newspaper's stereotyping plant—to client papers throughout the country.

"This is what is called in the craft as being on 'Easy Street.' You sit in your studio and turn out your copy, send it to your syndicate manager and the rest takes care of itself. You don't have to worry about collecting the money or any other phase of the book-keeping. The syndicate does it all. The usual rule is that the cartoonist

(Continued on page 198)

George McManus, another veteran of the comic strip artists who still rank at the top, is shown above. He tells in the accompanying article how he began his career sweeping the art department in a St. Louis newspaper and how he conceived the character Jiggs.

"Screen Oddities" (above) is an example of the latest development in popular cartoons. Unusual facts about screen celebrities, discovered by Captain Roscoe Fawcett, are turned over to his cartoonist-collaborator, Bernard Thompson, to be illustrated. Screen Oddities has a daily circulation of approximately 3,000,000.

Toy Firemen Make Lawn Sprinkling Play

Two miniature firemen work a pump on this toy fire cart with which little Jackie Clark, of Minneapolis, sprinkles his father's lawn. The working figures keep the youngster amused and on hot summer days give him a cooling shower.

JACKIE gets a shower and keeps the lawn sprinkled with a miniature pumping fire cart his father, B. A. Clark, of Minneapolis, built for him.

Two firemen that actually work a pump on the sprinkler keep Jackie amused while taking care of his father's lawn. The fire department sprinkler was built on an ordinary coaster wagon. It pulls the garden hose along wherever Jackie takes it.

The stream of water operates a device that moves the two miniature figures working the pump. A fire chief stands before them, watching their work. Mr. Clark reports he did not have to bother about watering the lawn or keeping Jackie cool after he built the toy fire cart.

Dog Rides Tricycle, Drinks Pop

A TERRIER, that rides a tricycle and drinks pop through a straw, has been trained by his boy master.

The dog has been taught to sit on the cycle seat without fear. He balances himself by putting his rear paws on the bars supporting the rear wheels. He rests his front paws on the handle bars. His legs are a bit too short for pedaling, but his young trainer enjoys pushing him around.

While the boy cools off with a drink of pop, his dog also goes through the act of sucking through the straw.

How well the terrier knows his stunt is shown in the photo on the right.

This terrier gingerly rides a tricycle and goes through the motions of drinking pop. His young master trained him.

Gar Wood Keeps Harmsworth

Miss Britain III, piloted by the English challenger, Hubert Scott-Paine, making a test run on the St. Clair river, near Detroit, in preparation for his bout with the redoubtable Miss America X. Here, powered by her 1,375 h.p. Napier engine, she is hitting off about 100 m.p.h., though half the time she is almost entirely out of the water.

Hubert Scott-Paine stripping his Miss Britain III down for action. Lightweight hull is made of duralumin, sandwiched between sheets of aluminum. Only one rudder is used.

British Challenger, Hubert Scott-Paine, at driver's position in cockpit of Miss Britain III. Unlike Miss America X, the driver and mechanic ride forward of the motor.

WITHOUT for a moment opening the throttle full blast, Gar Wood, driving the roaring *Miss America X* down a strip of the St. Clair river at Algonac, Mich., recently triumphed over the sleek *Miss Britain III* and so retained the Harmsworth Trophy in the United States for another year.

Although the little *Miss Britain III* had less than one-fourth the weight of the redoubtable American boat, and was driven by less than one-fourth the power, she gave Gar Wood some anxious moments.

In the first heat, Hubert Scott-Paine, driver and designer of the British vessel, trailed several miles in the rear of the Yankee boat at the goal line, but in the second heat *Miss America X* won by only a nose, 22.33 seconds, to be precise.

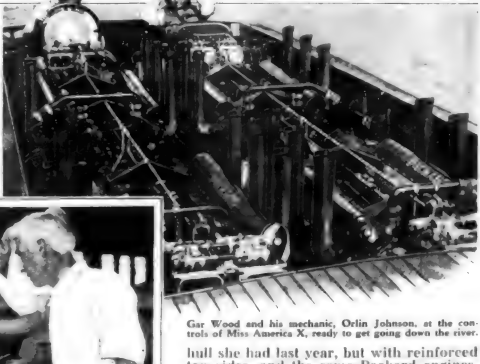
The challenger, *Miss Britain III*, furnished some thrilling moments for the thousands of spectators who lined the banks. At times she bounced completely out of the water, but the skillful maneuvering of the pilot always righted her. More than half the time she was riding in the air, spectators said.

Miss Britain III represents a radical departure in design of racing boats. She is a single-step hydroplane, (4 in. step) with an 8 ft. beam and a length of 24 ft. 6 in. Her motor is a Schneider Trophy Napier of 1,375 h.p.

Weight has been reduced to a minimum by the use of a light but astoundingly sturdy hull consisting of a duralumin sheet faced on both sides with a layer of pure aluminum. Speed also is greatly increased, since

TROPHY *in United States*

Gar Wood, winner of the 1931 Harmsworth trophy race, running with throttle wide open down a strip of the St. Clair river, the scene of his victory over the Britisher. Miss America X is the same boat used last year to put Kay Don out of the running, save that hull has been reinforced and engines pepped up to 6,600 h.p. Twin propellers were great aid to Wood when maneuvering about the course.



Gar Wood and his mechanic, Orlin Johnson, at the controls of Miss America X, ready to get going down the river.

The two contenders for speedboat honors are here seen inspecting the motor of the British challenger, Miss Britain III. Hubert Scott-Paine will match his boat against the American boat again next year, he declared.

the slippery metal offers a minimum of resistance to the water. As for the frames, or ribs, of the craft, they are the result of what is known as "flitching," that is, sandwiching a thin sheet of metal between two plates of sheeted metal, and fastening with small duralumin bolts and nuts.

Many of the details of Gar Wood's champion *Miss America X* are known to M-M fans. However, the old speed wagon has undergone some important improvements since she put Kay Don's *Miss England III* out of the running last year.

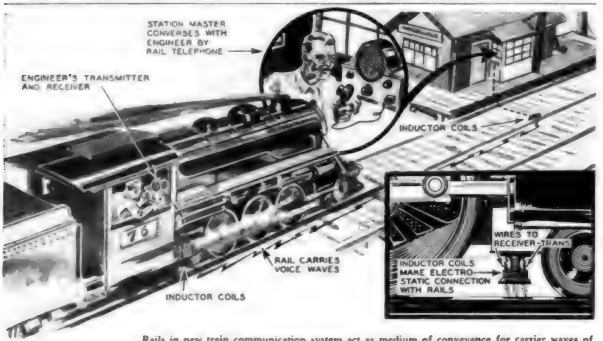
Miss America has the same mahogany hull she had last year, but with reinforced top sides, and the same Packard engines, but their power has been stepped up from 6,400 to 6,600 h.p.

The Harmsworth trophy is a plaque on which is depicted a speedboat tearing down the water course, and was placed in competition thirty years ago by Sir Alfred Harmsworth. Gar Wood captured it in 1920 and has successfully defended it seven times.

Here are tabulated outstanding facts concerning the latest contest on St. Clair river.

MISS AMERICA X	MISS BRITAIN III
Driver—Gar Wood	Hubert Scott-Paine
Length—38 feet.	24 feet. 6 inches
Beam—10 feet. 6 inches	8 feet
Type Hull—Single-step Hydroplane	Same
Material—Wood	Metal
Weight—14,000 lbs.	3,350 lbs.
No. of Motors—Four	One
Make—Packard	Napier
H.P.—6,600	1,375
Propellers—Two	One
Engine R.P.M.—2,500	3,600
Prop. R. P. M.—7,700	9,009

Rails Carry Voice in New Train Communication System



Rails in new train communication system act as medium of conveyance for carrier waves of voice signals. Signals are put into and taken out of the rails by means of inductor coils.

REPORTS or instructions can be exchanged between fast-moving trains and wayside stations, the conductor on the caboose can talk to the engineer, and enginemen can communicate with each other, thanks to the development of a new type of rail communication system by Westinghouse engineers.

The rails are used as the medium of transmission and the pickup of signals, which are put into and taken out of the rails by inductor coils suspended from the caboose and locomotive as illustrated in drawing above. A carrier current is superimposed on the rail by the inductor coils.

A three-tube transmitter and five-tube receiver are employed, operating on a frequency of 65 kilocycles. To establish communication it is only necessary for the parties to speak into the transmitter, the voice being heard in the loud speaker at the receiving end. The transmitters operate on 160 watts, with an output of 5 watts to the inductor coils.

Fokker Plane Has Simplified, Non-clogging, Retractible Landing Gear

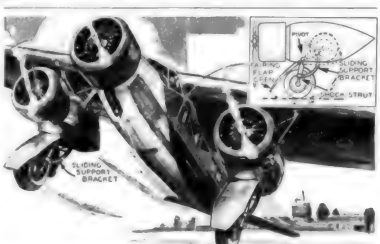
AN INNOVATION in retractible landing gear has been introduced in the new Fokker transport planes.

As shown in the accompanying artist's drawing, each landing wheel is pivoted in such a manner as to permit it to swing upwards and backwards into the engine nacelle. The tail wheel is retracted in the same way.

The fairing flap which closes the apertures from which the wheel descends forms an effective mudguard when the wheel is in landing position.

The advantages of this system, apart from its extreme simplicity, lie in the fact that it is not likely to fail when needed. Dried mud cannot clog up the mechanism — a common trouble with retractible landing gears.

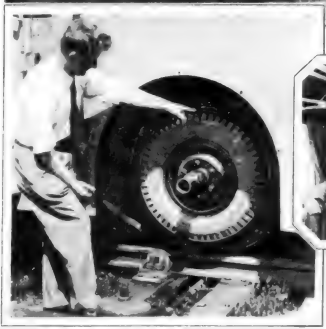
The new Fokker is powered with three Wright "Cyclone" motors and has a top speed of at least 186 miles per hour and a cruising speed of 155 miles per hour with a crew of four and sixteen passengers.



Each landing wheel unit swings upward and backward into nacelle of plane in new Fokker transport ship. Danger of clogging of mechanism is eliminated.

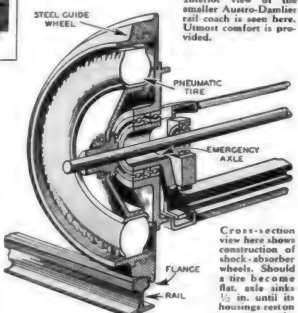
Pneumatic Tired Wheels Latest Rail Comfort

Pneumatic-tired wheels reduce clickety-click of rails to minimum on this 100 m.p.h. super-comfort rail coach.



Pneumatic tires on the new Austro-Damlier rail coaches are enclosed in a steel guide wheel with flanges to keep wheels on track. Compressed air in tire cushions shocks.

Interior view of the smaller Austro-Damlier rail coach is seen here. Utmost comfort is provided.



Cross-section view here shows construction of shock-absorber wheels. Should a tire become flat, axle sinks ½ in. until its housings rest on emergency axle.

A REVOLUTIONARY departure in the field of railway transportation is represented in the steel-shod pneumatic car wheels recently introduced for use on a new type of motorcoach known as the "Comet," now being tested on the Long Island Railroad.

As may be seen in an accompanying drawing, the pneumatic tires carry the load and roll inside a steel guide wheel which has the conventional railway flange and tread, cushioning the clickety-click so annoying to passengers.

The steel guide wheels are connected by a separate emergency axle below the load carrying axle connecting the pneumatic-tired wheels. Should a tire become flat, the load carrying axle sinks ½ in. until its housings rest on the emergency axle and the car continues on to destination without injury to the rubber tire.

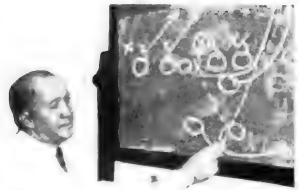
Streamline construction of the coach, shown at the top of the page, is used to reduce air resistance to a minimum and two internal combustion engines propel the car at speeds exceeding 100 miles per hour. The interior has all the modern comforts, and the car travels on an eighty or ninety mile schedule smooth as silk.

Licenses to Cure City Smoke Evil

WHAT is probably the first workable suggestion for stopping city smoke was made recently at a conference in London by a British fuel expert. This is to make every householder who wants to burn raw coal take out a municipal license for that purpose, like a dog license or a pistol permit. The scheme, it is believed, would induce many householders to use less smoky fuel which required no license.

FOOTBALL

This season will test the three great methods of strategy on which practically all gridiron offensives are based. Know these basic plays by reading this article.



The late Knute Rockne here is shown planning a passing attack for his famous football system.

THREE great systems of football strategy will go into action again this fall. Every college eleven will base some of their plays on one or more of these three effective offensive attacks.

When you see this season's games, watch carefully the plays as they unfold, note which system is being used, and see for yourself the type of attack that brings victory.

A large staff of investigators would be required to track down the multitude of football systems claimed to have been originated by many coaches throughout the country. However, only three have come to win national recognition. The three most widely known systems are: the Rockne, the Warner, and the Minnesota shift.

Rockne First to Use Shift

Any other system of attack must necessarily encroach upon at least one or all of these for they embody almost every known method of offensive play and the tried and proven features of attack. Perhaps the best known of these systems is that of the late Knute Rockne of Notre Dame, grand master of the game, whose football strategy gained a reputation for success second to none.

Although to a considerable degree the system was his own brain-child, Rockne, himself, once admitted that he had taken a few tips from Amos Alonzo Stagg, who, during his forty years at the University of Chicago, brought to light a multitude of plays for advancing the ball.

Rockne also insisted that Jesse Harper, who coached the Notre Dame team before him, was responsible for the victorious method of play used by the Irish.

Rockne, however, was one of the first coaches in the country to use the shift effectively. What he required of his players was a rapid backfield

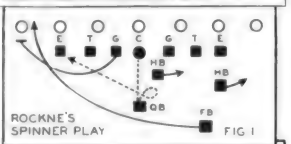
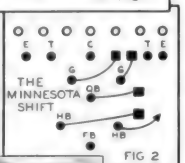
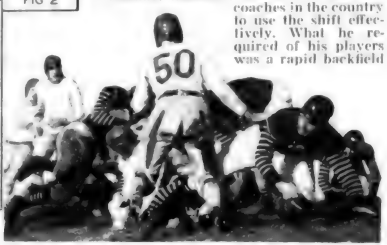


Photo above—Open field run after Notre Dame spinner play (Fig. 1) in which halfbacks going around right end fooled opponents while ball carrier (dotted line) went through left tackle. Right—(Fig. 2). Concentrated attack of Minnesota shift.



Dr. Harry L. Williams (above), originator of the plunging power offensive of Minnesota shift pictured at the right.



Which System?

by JOHN C. HOFFMAN

shift just before the ball was snapped. In themselves, the shifts were puzzling, but they played a minor part in the Rockne system.

The great Notre Dame coach's original shift was timed so that the backfield would be in motion when the ball was snapped, but when a rule was adopted to require the backfield to be stationary for at least a second before the ball was snapped Rockne dug out a new bag of tricks to fool his opponents.

Notre Dame Spinner Play Baffling

At the time the Irish football fans claimed the rule was changed to stop Rockne from winning, but the rule makers must have known that this play was but an infinitisimal part of the myriad of strategical elements that won game after game for the Irish.

Fig. 1 is an example of Rockne strategy called the "spinner play." Here we find two of the backfield men moving in around right end or through right tackle, as the case may be. A third back circles to the left. The ball carrier begins what appears to be a right end run, but spins quickly and skirts off left tackle, as shown by the dotted line. In the figures opposing players are shown by circles. With the Rockne teams this was a most successful play since every man on the eleven was trained to play a specific part in the construction of the attack.

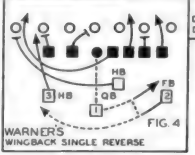
Every Play Planned for Touchdown

A virile factor in the success of the Rockne system was its psychological aspect. Every man on the team was firmly convinced the system was infallible and that Notre Dame could win any game it started. Drumming this into his men was a very definite part of Rockne's plan.

The importance of deadly blocking was another item of his program. Rockne continually plied his players with the idea that every member of the opposition must be eliminated from a play before it could be successfully culminated. It was his idea that any play, if every man blocked and tackled perfectly, could be turned into a touchdown. This is one of the reasons why

(Continued on page 130)

Glenn S. (Pop) Warner (left), football's greatest strategist, devised the game's most deceptive plays.



Warner's complicated double wingback, double reverse play (above) thoroughly deceived opponents. The ball was passed twice from player 1 to 2, then to 3. In the single reverse (left) one pass was made.

Player No. 40 is here shown making a gain following a Warner single reverse play.

There's a great thrill in watching plays unfold at football games. In this photo note how effectively the opposing players were taken out while the ball carrier went through the line

$150 Cash Prizes For the Most Novel Cigarette Holder

A good sample of what mechanical ingenuity combined with artistic ability can do in the way of turning out a practical but novel cigarette holder. The fear-stricken darky is grasping the life belt to save himself from the voracious whale.

HERE'S a "break" for you workshop fans who dabble in the simpler side of shop work. Build a cigarette holder—different and novel—and submit it to the editors of MODERN MECHANIX AND INVENTIONS as a contestant for some of the prize money MODERN MECHANIX AND INVENTIONS is offering in this unique "Christmas pin money" contest. Here are the details:

We are looking for the most practical and at the same time the most novel cigarette holder we can get so that plans can be run in the magazine. To call out the ingenuity of M-M readers the editors are offering $150 in cash prizes to be awarded as follows shortly after December 1st, 1933: First prize, $75; second prize, $40; third prize $25; and ten fourth prizes of $1 each.

The entries, which must be submitted to Cigarette Holder Contest Editor, Care MODERN MECHANIX AND INVENTIONS, 529 South 7th St., Minneapolis, Minn., must be sent postpaid to this office postmarked not later than December 1st, 1933.

Judging of the entries will begin on that day, and the awards will be made as soon thereafter as possible. Actual cigarette holders must be submitted so that we may dissect the prize-winners and make photographs from which an article may be illustrated. Do not send plans or drawings. No models will be returned. The decision of the judges will be considered final, and in event of a tie, duplicate prizes will be awarded. Employees of this publication and their families, of course, are not eligible to compete.

That's all there is to it! No strings, no muss or fuss or red tape! Somebody is going to have $75 first prize money for merely going to the workbench and concocting the most novel, rational and practi-

(Continued on page 143)

While not strikingly novel, this holder, turned out on a lathe, will win judges' attention because of its practicability.

Mechanical Secrets of MOVIE Gorillas

Levers pressing against jawbone of actor and strap fitting over lower teeth of actor permit him to simulate eating motions of real jungle beast. Nosepiece opens through nose in leather face of mask. Note the strap across the eyes which gives the beetle-browed effect to the brute's face.

Terrifyingly real, this gorilla is the work of Hollywood make-up men and mechanics. Skin of the face is made of leather. Note that actor's eyes peer through slits in skin.

EVER wonder how a Hollywood make-up man converts an actor into a terrifyingly realistic gorilla in those fascinating jungle pictures you watch on the silver screen?

A study of the photos above will give you an idea of what goes on behind a gorilla face. Mechanics have devised a set of mechanical facial bones and muscles which act as the skeleton for a leather "skin" which make-up men put on.

A simple set of levers on the mechanism and a strip clamping over the lower teeth enable the actor to open and close his huge gorilla jaws like the real beast of the jungle. A special strap over the eyes gives the beetle browed effect.

Ultra-modern Train Has Solarium

AS a bid for patronage a large western railroad is now constructing a 2-mile-a-minute train dubbed the "Zephyr" which offers the last word in comfort to passengers. The observation car is built like a solarium, the broad expanse of shatterproof glass being held securely by strips of stainless steel. Occupying a large part of the second car of this three-car articulated train is a buffet, as shown in photos below.

Left—The "Zephyr" buffet. Right—View of train solarium showing spacious glass area, strengthened by steel strips

Death Valley SCOTTY—the

In barren Death Valley Walter Scott (left) and Capt. Roscoe Fawcett meet again to swap yarns of the old West.

In desolate Death Valley strange building operations have puzzled the Southwest in recent years. Do they hide work in a great secret gold mine? Capt. Roscoe Fawcett renews his old acquaintance with Death Valley Scotty, the mystery builder, to seek the truth.

by

CAPT. ROSCOE FAWCETT

IN THE most weird and fiendish desert region on this continent, one of the hottest, most arid spots in the world, Death Valley Scotty reigns as king.

Death Valley, where the Amargosa river disappears, where "forty-niners" died of thirst, starvation and exposure in the mad rush for California gold, is the lowest point in the United States.

Yet in this desolate, barren realm Scotty has built a beautiful, vast castle, paid for from that mysterious source of untold wealth that others have sought and none have found. Around this grizzled, garrulous, tanned mystery man of the Death Valley desert innumerable myths and legends have arisen. His fabled secret gold mine has intrigued many desert rats and prospectors and not a few writers.

Since the early days of the century in the last fling of the wild

A county line mysteriously moved five miles after Scotty's gang ambushed a cavalcade seeking his mine. The notorious hoax is interestingly explained in the accompanying article.

This one-room miner's shack was Scotty's home before he built his castle. At heart still an old desert rat the wealthy Scotty often spends a night in the old cabin.

Desert's MYSTERY Builder

roaring West, I had known Death Valley Scotty. Our paths had crossed many times, but not until recently did I decide to accept his oft repeated invitation to see for myself the wonders he had built.

After a five hundred-mile motor trek from Los Angeles over desert and mountain, the glistening white towers and buildings of the great palace loomed before me. Much as I had heard about Scotty's castle, I was unprepared for this sight in the midst of barren, scarred canyons at the end of a rock strewn trail through desolate wastes.

To these imposing and beautiful buildings, nestled in the dry wash of Grapevine Canyon, I went to plumb some of the mysteries that surrounded the activities of blustery Walter Scott and seek the truth concerning that great, hidden gold mine that was believed to be the source of his wealth. There it was I witnessed the results of these unbelievable building operations carried on miles from civilization in the face of enormous difficulties.

Scotty Treats With Thousand Dollars

While his $65,000 automatic pipe organ played in the great castle, Scotty, in a yarn-swapping mood, supplied the answer to untold tales—how he once moved a county line "to save his hide from being hung on a fence," and how he created the illusion that he manufactured his own money by counterfeiting. These stories are legends in our great Southwest. I must and would find out the truth! But let me tell you—

My first meeting with Death Valley Scotty was during the last great outbursts of lawlessness and bloodshed of the West as a raw frontier was typical of this mystery man of the desert. As a newspaper's special writer, I spent three months of 1907 in Goldfield, Nevada, "war corres-

This handsome clock tower of the Death Valley castle houses the biggest set of chimes ever built, Scotty says. Some believe guards are posted in turrets at the top.

A general view of Scotty's castle and ranch in Grapevine Canyon is shown here. The clock tower stands out at left. Castle tower entrance can be seen at right.

ponding" the bitter fight between miners and operators of the great gold mines while federal troops sent by President Theodore Roosevelt tried to maintain order. One night I watched a burly giant of a man thrust his way through a milling throng in Tex Rickard's Northern and slam a yellow bill upon the bar.

"Drinks for the house," he bellowed. I gasped, for the place was packed. But as the bartender snatched up the bill, I caught a glimpse of its denomination.

A thousand dollar bill!

$2,000,000 Castle Has Two Wings

It was the first I had ever seen. Joining in the surge toward the bar, I elbowed my way into position to get a better look at the man who had tossed what would have been for me a half year's pay upon the bar. That was my first sight of Walter Scott whom the world then knew and still knows as Death Valley Scotty—a striking figure of a man, heavy, powerful and entirely at home in the hurly burly of that mining camp bar room.

More than two score years had elapsed since that first glimpse of Scotty, yet the man who had just greeted me in the wide patio of his $2,000,000 castle was practically unchanged, a trifle heavier perhaps, and a little more sun-tanned and grizzled. The patio in which we had met again was roofed over with rustic lattice. It separated two wings of the castle that were connected overhead by a bridge. An elaborate hand-wrought iron gate had been opened to admit us and then Scotty led us into the cool depths of a magnificent palace.

Death Valley Scotty.

Above — Part of the 240,000 railroad ties Scotty hauled fifty miles to his ranch. He says they are for fuel; others claim they are timbers for his mine. At right—A balcony and tower with the clock tower in the distance.

At left—The underwater glass-lined tunnel Scotty proposes to build so that visitors can watch divers in the desert palace swimming pool. Above—Workmen building the outdoor swimming pool which will be 250 feet long by 85 feet wide and 13 feet deep.

Materials Hauled 60 to 400 Miles for Death Valley's Beautiful Palace

Vast majestic interiors were the prevailing note. There was a drawing room like a motion picture set, its walls rising more than two stories to the over-arching ceiling. It was surrounded by balconies and at one end was a splendid fireplace.

At one corner of the main wing, Scotty had his own apartment on the ground floor. At each end on the mezzanine floors were guest apartments. There were spacious kitchens, bathrooms of regal magnificence and splendid pieces of furniture in keeping with the surroundings.

Scotty Reveals Building Secrets

Scotty, leaning back in his chair, his feet on a $1,500 desk, proudly told how he had built this miracle of the desert.

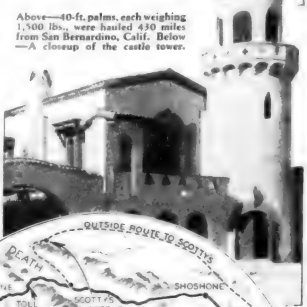
"Everything you see around here, except the sand, was hauled at least fifty-eight miles," he said. "I trucked those forty-foot fan palms four hundred and thirty miles from San Bernardino. There's three of them and each weighed fifteen hundred pounds."

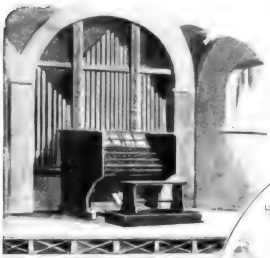
From the clock tower a magnificent set of chimes rang out.

"They ought to be good chimes," he

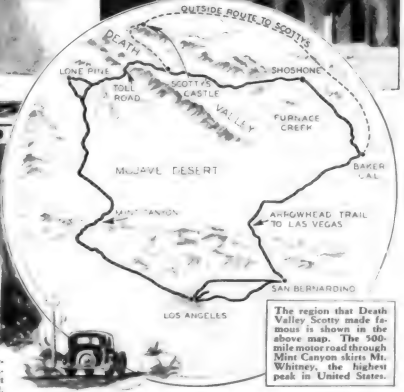
(Continued on page 132)

Above—40-ft. palms, each weighing 1,500 lbs., were hauled 430 miles from San Bernardino, Calif. Below—A closeup of the castle tower.





Above—The $65,000 automatic pipe organ may drown the noise of mining operations underneath. Capt. Roscoe Fawcett investigated and tells what he found.



The region that Death Valley Scotty made famous is shown in the above map. The 500-mile motor road through Mint Canyon skirts Mt. Whitney, the highest peak in United States.

Motorcycle Radio Transmitters Aid Police in War on Crime

Radio transmitters installed in motorcycle sidecars, as shown above, are used by British police to call reserves quickly.

DURING running gun battles with bandits, British motorcycle police can send radio calls for reserves through short wave transmitting sets.

The sending outfit is the latest police radio equipment for the quick suppression of crime. It is an addition to the usual receiving set tuned to the frequency of a central police transmitting station.

The motorcycle policeman travels with a radio operator who operates the sending and receiving sets fitted in a sidecar. When an alarm is received the motorcycle policeman rushes to the scene. If he finds that he is outnumbered and unable to handle the situation, his operator can transmit an alarm that can be picked up by other radio-equipped motorcycles in the vicinity.

Artificial Heart Revives Dead

AN ARTIFICIAL heart which revives dead animals and keeps them alive for more than three hours is being tested at the Georgetown University medical school at Washington, D. C.

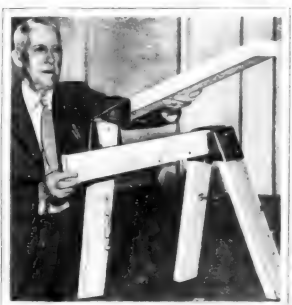
The "heart" consists of two rubber pockets which dilate and contract. The device is used to learn the effects of stimulating drugs on animals when their natural hearts are removed. The experiments are expected to reveal new knowledge of the cause of death following severe injury or shock to human beings.

Machine Cools Railroad Cars

RAILROAD passenger cars can be cooled during hot weather with the cooling machine shown in the photograph below. Before the train departs from a station the machine forces cold air through the pipes.

The movable refrigerator shown above forces cold air into railroad coaches to make them comfortable in hot weather.

Sawhorse Folds Into Handy Pack



This newly invented collapsible sawhorse folds into a compact bundle. It is very rigid when put together.

A COLLAPSIBLE sawhorse that can be readily dismantled into a compact bundle of 2x4's has been patented by a Denver inventor.

The sawhorse is made of ordinary timber. The legs are fitted with metal hinges. These have protruding edges that come under the rail and form a rigid clamp. Half way down each pair of legs is a turnbuckle fastened at one end with a screw eye and at the other end by a screw hook. When the turnbuckle is tightened the sawhorse is as rigid as if it were nailed together.

Dismantled, the sawhorse takes up no more room than five short 2x4's bundled together. The pack can be easily carried by a carpenter with his usual tools. The collapsible sawhorses also conserve space in contractors' trucks in moving from one building site to another.

Rolling Barrel Vehicle Carries 8 Passengers in Tub Body

RESEMBLING a rolling barrel, England's latest vehicle, the "Dynasphere," carried eight passengers in a successful demonstration at Yeovil.

Built especially for the sea shore, the "rolling barrel" cannot upset. Its passengers ride comfortably in a tub-like body which always remains in a horizontal position, as shown in the photo at right. The barrel-like structure is driven by a gasoline motor mounted in the body. The machine can be steered by the driver as easily as an automobile or most any other motor-driven vehicle.

This 8-passenger "Dynasphere" rolls along like a barrel.

187,500 Mile Non-stop Auto Test

A STANDARD four-cylinder automobile covered 187,500 miles at an average speed of 58.3 miles an hour in an endurance test in France.

When the car was stopped, Andre Citroen, head of the concern manufacturing the car, said the machine had suffered no mechanical breakdown. The car was dismantled and examined by the French automobile club.

Steam Filling Stations Keep Locomotive Going

World's oddest locomotive cannot generate its own steam.

STEAM filling stations are an absolute necessity for the world's oddest locomotive, the "galloping thermos bottle" of Java.

The contraption has no firebox to generate steam and no tender to carry fuel. It stops at a station. The attendant pulls out a hose from a steam generating plant and fills the "thermos bottle's" huge steel boiler with high pressure steam.

Full of pep and power, the steam tram rattles from the station through the streets of Batavia, capital of the island. But as it nears the next station, it may be seen chugging wearily, desperately puffing for its next load of steam. If the "galloping thermos bottle" ever gets overloaded, it may not reach its next station. Then the engineer may have to send the conductor down the track for a bucket of steam.

The "thermos bottle" steam tram taking on a load of steam at a filling station is visualized in the above cartoon. The steam thus taken is sufficient to send the odd contraption rattling through the streets of Batavia to the next station.

World CELEBRATES the

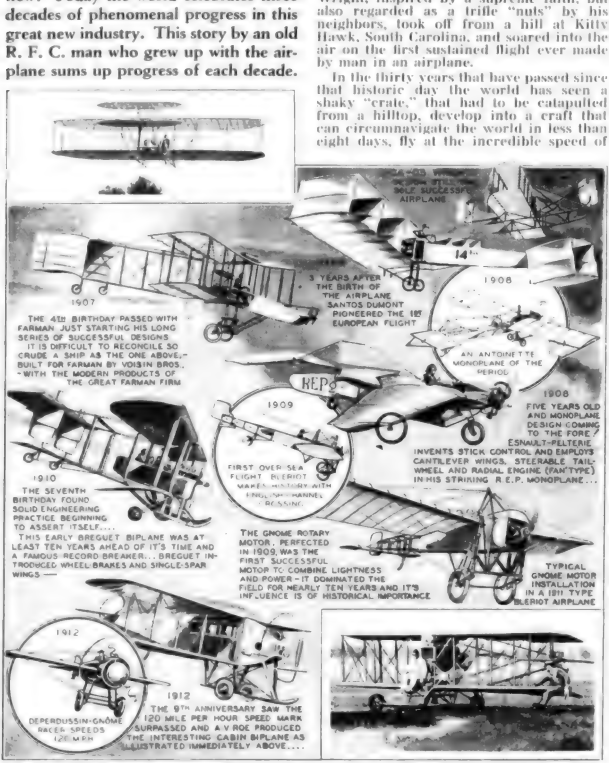
by DOUGLAS ROLFE

Thirty years ago this fall the airplane first flew! Today the world celebrates three decades of phenomenal progress in this great new industry. This story by an old R. F. C. man who grew up with the airplane sums up progress of each decade.

THIRTY years ago, on December 17, 1903, an obscure event occurred which now may be rated as epochal in the history of mankind.

It was on that bitter cold day that Orville Wright, inspired by a supreme faith, but also regarded as a trifle "nuts" by his neighbors, took off from a hill at Kitty Hawk, South Carolina, and soared into the air on the first sustained flight ever made by man in an airplane.

In the thirty years that have passed since that historic day the world has seen a shaky "crate," that had to be catapulted from a hilltop, develop into a craft that can circumnavigate the world in less than eight days, fly at the incredible speed of



Primitive planes of the 1903-1913 period, when aviation was in its swaddling clothes, are depicted here. In the top photo is seen the early Wright biplane, while below is the early pusher. Many of these early planes embodied features used today.

Airplane's 30th Birthday

more than 400 miles an hour, or cover a distance of 5900 miles without touching earth.

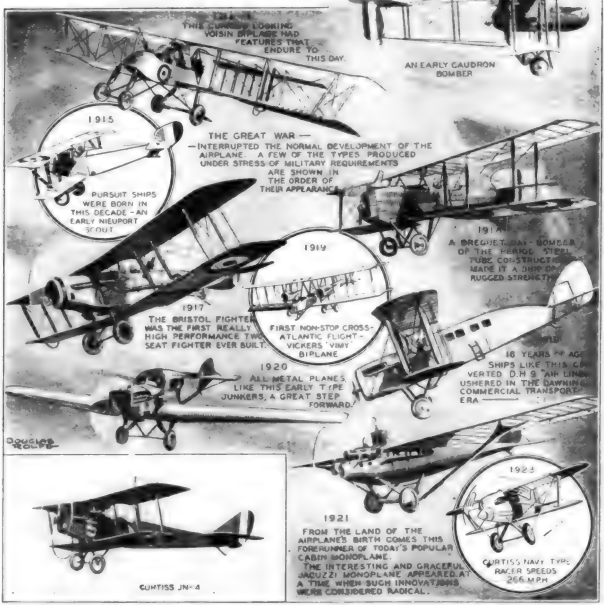
So amazing has been the progress of the airplane that people who have lived long enough to compare the airplane in its swaddling clothes with the lusty aeronautical giant of today, have come to expect miracles of aviation engineers in the next five years. Very likely they will find their expectations justified.

Three Distinct Decades

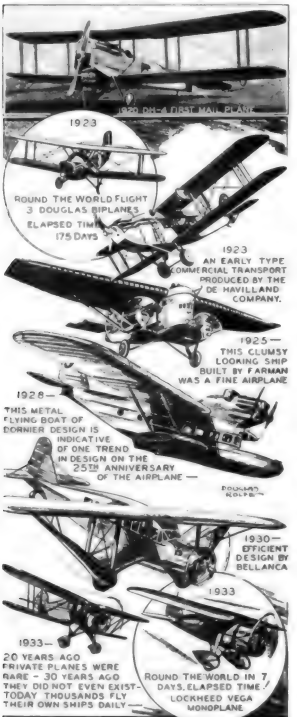
Aviation's three decades of history are grouped into three well-defined periods, as follows: Pre-war, or 1903 to 1913; war and post war period, 1914 - 1923; and, finally, the dawn of the commercial era, 1924 to the present day.

From the date in 1903 when Orville Wright summoned up the unheard-of courage to take to the air, up to 1905, few people realized that man had actually conquered the air through a "flying machine." The accomplishment seemed unbelievable.

The Wrights marched forward, undeterred by the gibes of unbelievers, and later on Sept. 8, 1908, in a much improved craft, they astounded the world by staying aloft for one hour and fifteen minutes. Their final triumph came when after a demon-



Improvements on early planes may be seen in these planes appearing during the 1914-1923 period. Famous for its war-time capabilities was the Jenny, seen below. At top, the Caudron. Most of these ships were developed under stress of war.



The third decade, or post war decade, development is summed up here. New departures, starting from first DH-4 used for U. S. commercial aviation, through the epochal world flight of '23, to Post's single handed world girdling flight in an ordinary machine in slightly over 7 days elapsed time, using robot pilot.

stration at Fort Meyer, Va., the "flying machine" was accepted by the U. S. Government as a practical military possibility.

At about this time spectacular advances were being made across the water. Santos Dumont, a Brazilian living in France, made the first successful European flight. This feat so astounded Europe that immediately there was set in motion a great wave of activity all over the continent to perfect the new plane. Bleriot, caught by this tidal wave of aeronautical enthusiasm, flew his awkward monoplane across the English Channel, and so became the Lindbergh of his day.

Early Planes Had Advanced Features

Technical analysis of this first period shows that early aeronautical engineers really introduced many of the plane features that are regarded as advanced thought right today. For instance, Bleriot's first plane was a low wing monoplane, while Bregeut used steel tube construction.

Radial motors were used at that date, and strangely enough, metal propellers. Levasseur, designer of the famous Antoinette monoplane, produced in 1912 a low-wing, thick-wing, monoplane which was a marvel of complete fairing—even to wheel "pants."

In America Glen Curtiss produced the first flying boat to meet with anything like success, and developed a motor which, later known as the OXX 5, contributed largely to the success and progress of aviation. The end of the decade saw fundamental principles of design universally accepted.

War Had Pronounced Effect on Planes

The second decade, beginning when the war dogs were unleashed in Europe, made heavy demands upon airplane designers. A sturdy fighting machine was called for, and builders responded with designs which represented little in the way of novelty, but which could be turned out in mass production.

Fast little craft which could duck and dodge, and huge awkward bombers came to the fore in this period. In the beginning of the Great Slaughter planes were used for observation purposes only, but then when pilots took to shooting at each other with rifles and pistols things took on a truly military aspect.

It was at this point that Anthony Fokker made his appearance with the development

Last word in aeronautical achievement is this 32-passenger transport plane.

of a machine gun that would shoot synchronously through a propeller.

It was the war which really showed the world the potentialities of the aeroplane, which had since its infancy been regarded as a circus toy. Under the stress of war time necessity motors were greatly improved and the speed of the plane was greatly increased.

However, it was flying technique which saw the greatest development. Aces coming home after the war knew plenty about looping-the-loop, barrel-rolling, Immelmann turning, and all the other maneuvers necessary for getting the best of an adversary in a "dog fight."

Endurance Flights Began After War

After the war aviation marched steadily onward. Endurance came to be the watchword among designers, and many notable long distance flights were made. Commander Reed flew the Atlantic with his huge flying boat. In 1919 Alcock and Brown had made the first non-stop Atlantic crossing. Toward the close of this period the American round-the-world flyers made history with their epochal exploit.

Then came the dawn of the commercial era. International air racing, such as the Schneider Cup race, was beginning to exert a profound influence on high speed designs. In a few short years the speed of the airplane attained the 300 mile mark and then progressed somewhat more slowly to the 400 mile mark.

In the meantime the ordinary type of airplane was gradually becoming a commercial possibility. Starting with "joy-riding" concerns it kept a precarious footing in the money earning field until Lindbergh's classic flight to Paris roused the entire world to a new enthusiasm. Public interest in the airplane was unbounded.

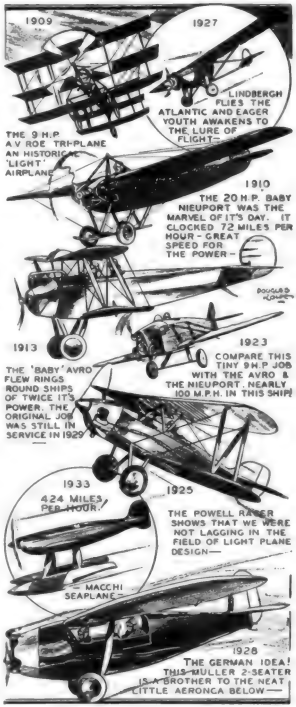
Planes Interested Businessmen

It is at this moment that we see the airplane being regarded for the first time as a business possibility.

A few short years after the New York-Paris flight public transport companies were definitely established. Landing fields and airports were spread over the entire world and competition commenced between rival firms, even rival countries, for the mail and passenger traffic.

The purely commercial plane, as contrasted with the military or ex-military plane, now came definitely to the fore.

(Continued on page 135)



Lightplanes contributed highly, being pets for embryo experimenters. From Avro triplane to Aeronca below is a long step. Present ships have ample stamina and safety.

America's pet lightplane carries two, is safe. Over 300 now in private use.

Sanabria Light Heralds Television Movies

Scenes in department store were televised to the display window. Sanabria's carbon-dioxide arc lamp, shown at left, was utilized.

AGAIN Ulysses S. Sanabria, young Chicago radio wizard, comes forward with a television development which advances broadcast movies another step towards perfection.

Sanabria's invention this time is a glass-enclosed carbon-dioxide arc lamp that rivals in intensity the electric arc used in motion picture production.

High power of this light makes possible the projection on a screen four feet high and six feet long of images of exceptional clarity.

Sanabria proved the practicability of his new instrument recently in an exhibition at a New York department store. Scenes buying within the store were televised, transmitted by wire, and reproduced in a street display window for the entertainment of passers-by. Sanabria, in a recent interview, expressed himself as confident that we would be witnessing home television shows within the next two years.

Sanabria inspecting televisor of his invention. He is connected by phone with operator of projector in window.

Front view of the televisor, showing photo electric cell bank.

Earth 330 Million Years Old

MOTHER Earth is 330,000,000 years old, says a French scientist. This figure was arrived at by calculations on the radio-activity of lead, thorium and uranium.

Makes Any Shoe a Golf Shoe

WITH detachable cleats recently perfected, any shoe may be made into a golf shoe in a few seconds. Regulation golf cleats are fastened to a plate of spring steel which may be fastened to any type shoe by clamps operated with a tension lever. The cleats weigh less than four ounces and may be carried in the pocket of a golf bag.

Cleats attach to a steel plate.

Taxidermy is New Field for Home Craftsmen

Only a few inexpensive tools are required in mounting small animals. Here is seen a home craftsman putting the finishing touches on a fox. Skillful taxidermists earn sizeable incomes mounting hunting trophies.

Above—One of the old stand-bys of the taxidermists' art—the stag's head mounted above the hall hat-rack. Right—Creating groups of small common animals to represent human situations is one of the most popular departments of novelty taxidermy. Comical mountings like this one attract widespread attention and quite often lure buyers who become a potential source of income for you.

Highly ornamental is the mounted hoot owl, shown above, who is more good mounted than in his natural habitat.

TAXIDERMY, an art fast growing in popularity, is opening a new field of interest to the home workshop fan and revealing a new source of ornamentation for household articles.

The many useful articles that are built by the home craftsman can be ornamented with mounted birds and animals, thus adding new interest and charm to commonplace objects.

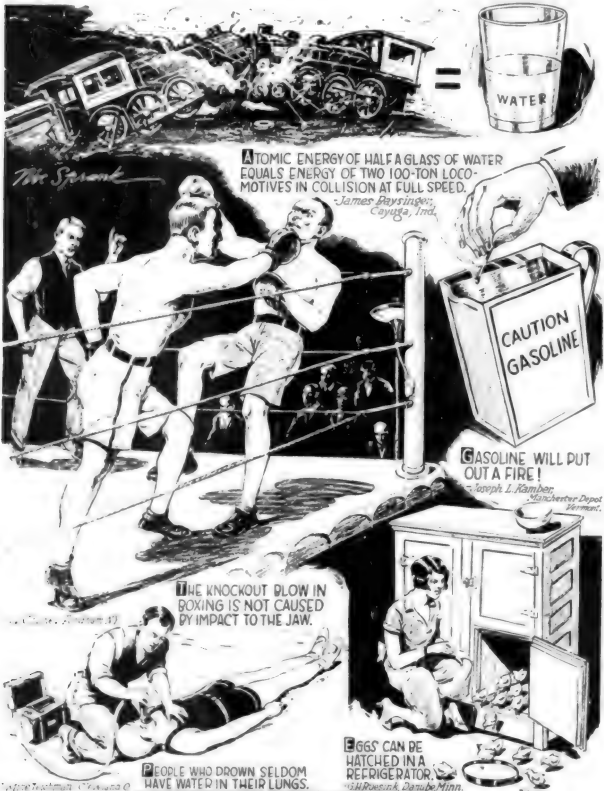
Lamps, book-ends, door-stops, hat-racks, picture frames, gun-racks, are a few of the objects that lend themselves well to ornamentation. When decorated with taxidermy work, they immediately possess new life, interest and attractiveness.

The most common of birds and animals are employed in taxidermy. Squirrels, rabbits, frogs, pigeons, in fact, any easily secured specimens may be converted into highly interesting, useful or humorous creations. In the accompanying photographs are shown a specimen of the unique and ornamental art-pieces that attract instant attention and bring the out-of-doors atmosphere into the den, library or nursery.

Not only is taxidermy a fascinating hobby for the home craftsman, but it is a source of income for those who go into it deep enough to learn to turn out artistic pieces. As wild game has grown scarcer, and the open season restricted more and more, the true sportsmen have turned in increasing numbers to the taxidermist to preserve their trophies.

Creating groups of common animals to represent human situations is one of the most popular departments of novelty taxidermy. A pointed example of this is presented in the photo of the squirrels getting married. It is easy for the ingenious workshop fan to imagine many similar creations.

ODDITIES of SCIENCE

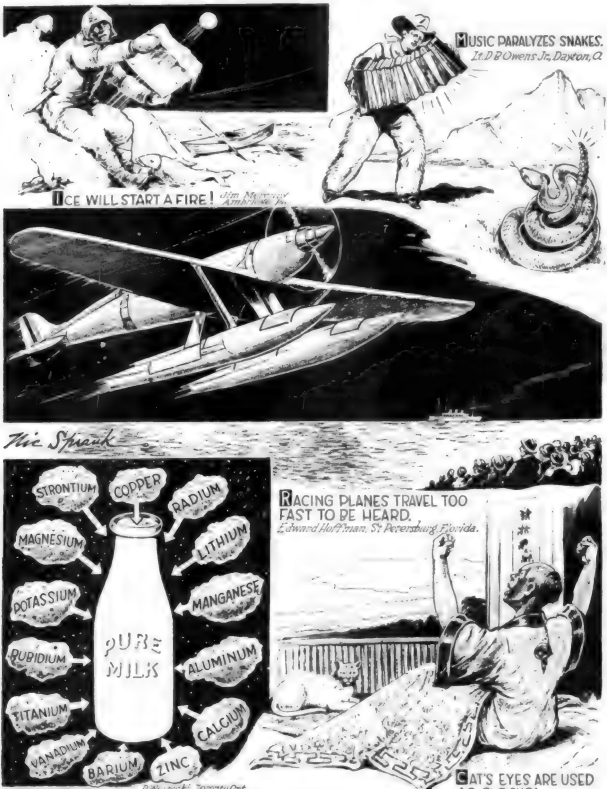


EXPLANATION OF THESE ODDITIES ON PAGE 24

On the surface many odd facts that seem to defy natural law are easily understandable when the physical conditions back of the phenomena are known. Here are two pages illustrating facts that appear fallacious at a casual glance, but which are quite natural when all conditions surrounding them are considered. If you want to know the explanation of these seeming oddities consult page 24, and remember Nic Spronk pays $1 for oddities acceptable to M-M editors.

by Nic Sprank

Strange Facts that Seem to Defy Natural Laws



EXPLANATION OF THESE ODDITIES ON PAGE 24

These strange facts of science call to our attention a few of the things which on every hand refute some of our accepted notions about nature. ONE DOLLAR will be paid you by Nic Sprank for every Oddity he considers good enough to make this page. Try your luck! Send in something new—don't re-hash the obvious, and your chances of cadging a dollar bill are as good as the next man's. Address Nic Sprank, care Modern Mechanix, 529 So. 7th St., Minneapolis, Minn.

New Inventions Make the

So arranged, for height and otherwise, that the door opens at the touch of the knee, this new door latch proves a great boon to housewives, especially when both hands are full.

Combination electric wall clock and switch turns off freezing unit of electric refrigerator and automatically switches it on again in a few hours, eliminating danger of temperature rise to point dangerous to food maintenance.

Ordinary bath tub is converted to a shower by means of this new device now on market consisting of chromium plated brass tubing hooked to faucet. Invigorating spray does not wet hair and requires no curtain. Small washers prevent scratching the enamel of the tub.

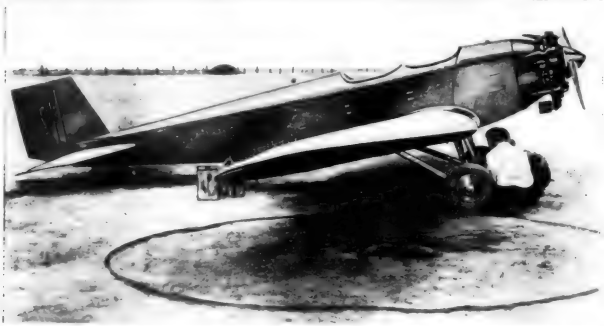
Housewife's Work EASIER

Coffee coming from this mill hasn't the slightest taste of metal, owing to the use of the stone wheels which grind coffee into bits. Right—Placing clothes in this cabinet eliminates moths.

If you should stick your hand in the blades of this fan no harm would come to you for simple reason that blades are made of web cloth. Engineers find that cloth blades deliver just as strong a blast as metal blades.

Waffles need no longer bore you because of their monotonous uniformity, thanks to this new iron which turns out fancy - shaped waffles which lend themselves well to decorative purposes.

Stops Runaway PLANE by Shooting Tire



This runaway plane ran around in the circle shown for an hour and a half after an officer shot one of the tires.

A RUNAWAY plane drew a perfect circle on the ground after a police officer shot one of the tires to prevent an accident.

C. A. Simpson, of Whittier, Calif., stopped his plane near Oceanside, Calif., to adjust a spitting carburetor. While he was working on it, the motor suddenly picked up, carried the plane away and threw Simpson to the ground.

The monoplane was heading across the field when a passing motorcycle policeman saw it. He stopped, aimed his revolver at one of the tires and fired a bullet through it. Blowing out the balloon tire stopped the plane from heading across the field and caused it to run around in a circle.

With the blown-out tire forming the center of the circular course, the ship ran around until it ran out of gasoline.

Giant Seaplane Rivals Famed DO-X

THE largest seaplane built since the famous giant 12-engined Dornier amphibian DO-X has been completed by France for commercial trans-Atlantic flights.

The French rival of the 162-foot DO-X has a wingspread of 130 feet, carries 3,000 gallons of fuel and has a cruising range of 3,400 miles. The French plane, named "The Santos-Dumont" in honor of France's pioneer flyer, can carry more passengers than the larger DO-X. The German ship was built for 54 passengers and a crew of 15. The French plane can carry 60 passengers and a crew of eight. In a test flight, however, the DO-X carried 169 persons for 110 miles.

The Santos Dumont will be used over the South Atlantic ocean.

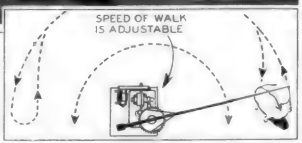
The giant French seaplane, "The Santos Dumont," shown here, can carry more passengers than the famous DO-X although smaller than its German rival. The French ship has four motors, three in front and one behind the wing.

Merry-go-round Puts Prize Bulls Through "Daily-Dozen"

Bulls are kept in trim with this merry-go-round by pacing them four hours a day at one and one-half miles an hour.

A NOVEL merry-go-round device has been designed for exercising bulls and keeping them in good shape and health.

Used by the agricultural school of a university in the northwest, the device leads bulls around in a circle or half circle at a speed of one and one-half miles an hour, usually for two two-hour periods a day. A one-half horsepower motor runs a geared unit operating the two 15-foot arms.



Operation of the exerciser for bulls is shown in the above drawing. A one-half horsepower motor drives the arm which can be adjusted for full or half circles. A lead rope from a nose ring is attached to a spring on the arm.

Dog Now Has His Own Auto Seat

The pet dog has his own box seat attached to the front seat of an automobile as shown in the above photograph.

THE pet dog can now ride in a specially designed auto seat mounted on top of the front seat cushion.

The box seat gives the dog an excellent view of passing scenery and leaves the rear seat free for other passengers. The box is held in place by straps running over the front cushion and by two metal braces which are screwed to back of front seat.

Suffers Pains From Radio Waves

INTENSE pains from radio waves disturb Martin Bodker, of Tacoma, Wash., unless he grounds himself. His case has baffled specialists.

The pains, resembling rheumatism, began several years ago, but physicians could find nothing wrong with Bodker. He discovered one day that the pains disappeared while he put his hand on a water faucet.

Flashlight on Gun Aids Hunter

SHOOTING big game at night will be made safer and surer by means of a flashlight attached to the fore-arm of the rifle.

The device has been designed by Capt. R. Stuart Murray and Major George Witten who will lead an expedition to Honduras to collect valuable specimens for the American Museum of Natural History in New York.

A five-cell focusing flashlight is attached to the gun by means of automobile steering post clamps for holding electric lamps. Light usually holds animals spell-bound. The focusing beam will pick out the animal and permit the big game hunter to get a careful, sure aim.

By using this device, Capt. Murray and Major Witten will be able to get many specimens that roam through the forests only at night. How the flashlight is attached to the gun stock is clearly shown in the photograph below.

The flashlight attached to a rifle by clamps as shown above has been designed to aid big game hunters at night. The device will be used by an expedition to Honduras.

Bag More DUCKS by

Duck shooting is not a hit or miss proposition. Simple scientific tips, revealed here, will help you to become an expert in this great autumn outdoor sport.

Above—A fine catch brought down by knowing the correct ammunition and "load" necessary for the various kinds of water fowl.

BAG more ducks and save ammunition by learning the simple scientific factors that enter into the sport of duck shooting. The good wing shot is not a "born sportsman."

Good shooting is the result of study of the speed of the game, velocity of ammunition, and persistent target practice that develops perfect coordination of mind and muscle.

Many sportsmen who hunt ducks do so with an improper shotgun. Generally speaking, any firearm bearing the brand of a reliable American manufacturer will prove dependable but remember fancy ornamentation does not mean more hits. On the other hand, any good shot can get a few ducks with almost any blunderbuss, but his misses will far exceed his hits.

For those who can afford only one shotgun, either of the following is recommended: a double barrel 12 gauge hammerless with ejectors, right modified, left full choke, 28-inch barrels, the arm weighing about 7½ pounds; or choice of an automatic or pump gun with two interchangeable barrels, one a 26-inch improved cylinder barrel for upland bird shooting and the other a 30-in. full choke for duck shooting. The "all-around" shotgun will be chambered for 2¾-inch shells, loaded with

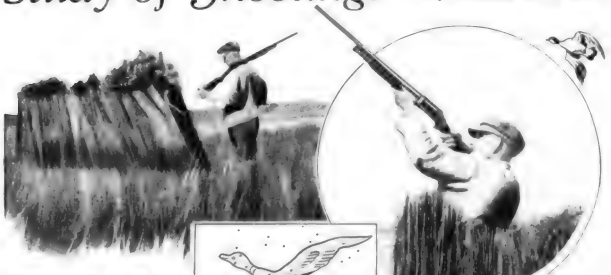
Above at left — When river hunting, the boat should be camouflaged with grass and bushes as shown. River hunting requires more skill than shooting from a blind as the hunter must always be on the alert. Below at left — Bringing home "the bacon" after a day on the river.

Life-size wooden duck swinging from a tree, as a good target.

River hunter should follow convex banks as shown in this drawing. Travel as quietly as possible.

Study of Shooting

by Richard K. Wood



The blind (above) that will fool the wariest ducks and geese is made by cutting tall dead grass and weaving it into a mat five feet high and long enough to enclose three men.

"PATTERN OF SUPER X RECORD LOAD AT 60 YARDS

What happens to the shot when it reaches the target is shown above.

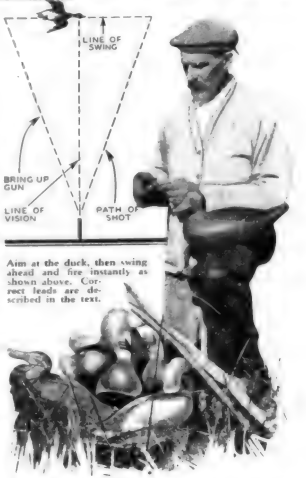
Above—Shooting from a blind. The blind is used usually on marshes and big water and is located on a flight path or near a number of decoys that will bring in the ducks.

Three drams of powder and 1¼ ounces of shot, size four for ducks. Such a load shot through a full choke barrel of 28 or 30 inches, will kill ducks consistently at forty to fifty yards. This range will suffice for average shooting, particularly from a blind.

Those who can afford a special duck gun will go in for a super arm that will reach out to seventy yards and bring down the toughest mallards. Personally, I see no need for a larger bore than 12, or more weight than 8½ pounds with present day efficient ammunition. After all, it is more important to pick a gun that you can handle well, that fits you, than one which will kill ducks beyond retrieving range. Give the fellows in the next county a chance. Incidentally, a 20-gauge with a 28-inch full choke barrel, shooting speed loads, is a real duck gun for the experienced shooter. It will make a clean kill up to 40 yards—either kills or misses. The range is about ten yards shorter and the pattern smaller than the 12 gauge. Its advantage is lighter weight.

The general method of shooting ducks is to bring the gun up into line with the path of flight, then swing ahead of the object, so that target and shot, both traveling at high

(Continued on page 136)



Aim at the duck, then swing ahead and fire instantly as shown above. Correct leads are described in the text.

The duck hunter is shown here tieing anchors to decoys. Decoys can be anchored at a known distance, greatly simplifying the troubles of the novice. They should be set out to windward.

Speed of Water Fowls' Flight

Mallard, black duck, shoveler	50 m.p.h.
Pintail	60 m.p.h.
Redhead and wild geese	90 m.p.h.
Blue-winged and red-winged teal	100 m.p.h.
Bluebill	110 m.p.h.
Canvasback	120 m.p.h.

Money-Making Stunts Bring Extra Income

A Rustic Furniture Builder

Building rustic furniture brings a good profit to a man in Traverse City, Mich., who owned a few acres of wooded land. He made signs, benches, chairs, tables, swings, flower boxes, and baskets. These he sold to the city for the parks and zoo and also to people who put them in their gardens and on porches.

Design Automobile Trailers

Small two wheel automobile trailers can be built on old auto chassis and sold for about fifteen dollars each. A man in San Diego, Calif., found that he could obtain old auto frames at automobile wrecking places for almost nothing, as they are the only part of a car that cannot be resold for repair parts. With a few tools and a little ingenuity he designed trailers for campers and tourists. He found that Model T Ford frames were the best as they are light and also quite plentiful.

Sell Roadside Advertising Signs

Considerable profit can be made by putting up roadside advertising signs for merchants, especially hotels, restaurants and garages catering to tourist trade. A man in a southern city prepared samples of several types of roadside signs, including large wood signs, smaller sheet metal types to be nailed to trees, durable iron signs, and artistically painted advertisements. These he took to the merchants and arranged to erect them along roads. The cost was prorated over a period of months, the initial payment usually covering the expense of building the sign. The work of preparing the signs was given to painters.

Big Income in Model Planes

By building and selling model airplanes a man in New Bedford, Mass., is earning more money than he ever did before.

In every boys' club in the city he placed a model airplane with an attached printed card giving his name, address, and the cost of the models. He also organized a boys' model airplane club and supplied the boys with parts for building their own planes. He became so busy that he had to hire two men to help him.

Home-made Telescope Makes Money

A very profitable business was developed by a Dallas, Texas, man with a home-made telescope. The telescope was built for ten dollars from plans given in the July and August numbers of MODERN MECHANIX AND INVENTIONS. The telescope was placed in parks of the city. On it was hung a sign reading, "See the craters on the Moon—only 10 cents."

Telephone Correct Time Agency

A correct time service agency can be developed in towns where telephone companies do not supply this service. Profit is made by reading a brief advertisement, sold to local merchants, before giving the correct time. Such an agency has helped a man beat the depression in Eau Claire, Wis. Anyone can call the agency and get the correct time free.

One-man Submarine a Money Maker

A good income is being made by a St. Petersburg, Fla., man with a one-man submarine built according to plans given in the September MODERN MECHANIX AND INVENTIONS. He charges two cents a minute to tow a person in the submarine with a motorboat. Some people ride in the sub as long as twenty minutes.

Trading School Books for Profit

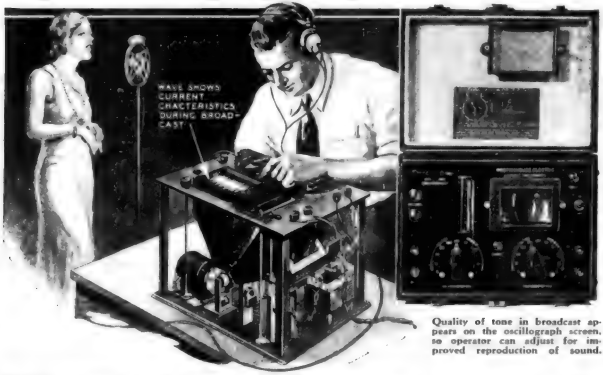
By trading used school books a young man in Denver, Colo., has built up a profitable business. He made a thorough canvass of the city and made a list of people who had school books to sell as well as of those who wanted to buy school books. In this way he found out how many books he could sell. He went back over his route buying and selling the books. His profit on each book sold averaged about 25 per cent.

A Women's Selling Exchange

You can collect good commissions by organizing a women's exchange in your town where women can sell their home-made articles and products. The exchange can be operated in your own home or in a store in the business district. The exchange gives the women an opportunity to make money by selling their canned goods, garden produce, wearing apparel, hand-made rugs and quilts, pastry and needlework. A commission of ten per cent is charged for everything sold.

With this issue, Modern Mechanix and Inventions will terminate its presentation of the money making ideas, since President Roosevelt's NRA program is beginning to solve the unemployment problem. Hundreds of ideas which have been submitted but not used here cannot be returned since no postage was enclosed with the manuscripts.—M-M Editors.

New Oscillograph Improves Broadcasts



Quality of tone in broadcast appears on the oscillograph screen, so operator can adjust for improved reproduction of sound.

WHEN listening in on the radio from now on you may hear programs with greatly improved tonal character, thanks to the development of a small portable oscillograph which instantly detects defects in vocal and instrumental sound reproduction, and which will correct these defects as they occur.

With the screen of the oscillograph before him, a station operator can keep continuous check on distortion and over-modulation of radio waves, spelling level signal strength and faithful reproduction at the receiving end.

Vibrations of the sound being transmitted appear on the screen of the oscillograph in zig-zag lines. Good tonal quality forms even saw-teeth, poor quality is jagged.

Strange Fate of a Famous Plane

FIVE years ago, when Kingsford-Smith was grooming her for a spectacular dash across the Pacific, the "Royal Albatros" was the cynosure of all eyes. The noble plane was replaced by a Wilkins Fokker on that epic Pacific flight and for various reasons "Royal Albatros" was junked.

Several months ago an enterprising mechanic stumbled upon the tri-motored ship in an obscure airplane boneyard. Touched by the pitiful condition of the plane he bought her, and now she is happily serving as a gasoline station in Hollywood.

The ship's great wings serve as a canopy over the six gas pumps, while the fuselage does duty as an office.

Once the pride of the aeronautical world, the "Royal Albatros," which fell down on the job of transporting Sir Charles Kingsford-Smith across the Pacific, was rescued from oblivion in boneyard and pressed into service as a filling station in Hollywood. Fuselage now houses office for attendants and show room for auto accessories. The Royal Albatros was replaced on the epic flight by a Wilkins Fokker.

Aviators Become Acrobats to Escape Tangled Landing

Caught in the above predicament, two Dallas, Texas, flyers escaped unharmed by climbing down a rope to the ground.

GYMNASTIC ability will be one of the requirements for aviators who pick power lines for landing fields.

Coming down for a landing recently, the plane of Marion Taylor and Chas. B. Large swooped into high tension wires at Dallas, Texas. The landing gear, locked in the wires, kept the ship from crashing to the ground. For about fifteen minutes the men hung upside down. Finally they came down a rope "hand over hand" from their 40-foot perch to safety.

Hose Cleans Kalsomine Brush

BY replacing the handle with a garden hose a new kalsomine brush can be cleaned more thoroughly than the ordinary brush.

The detachable handle is secured to the back of the brush by means of a standard hose coupling. A ferrule ¼ inch from the base of the bristles forms a water channel to perforations between the rows of bristles.

A garden hose or water faucet thoroughly cleans this new kalsomine brush. The hose screws into the handle coupling and shoots water through perforations between the bristle rows.

Daring Airman Plucks Handkerchief From Flying Field With Wing Tip

FOR a real thrill ride with Major Ernest Udet as the tip of his airplane wing snatches a handkerchief from the ground, Udet, famed German World War ace and probably the greatest stunt flyer in the world, features low flying in his bag of tricks, but picking up the handkerchief is the latest, most thrilling and daring of all.

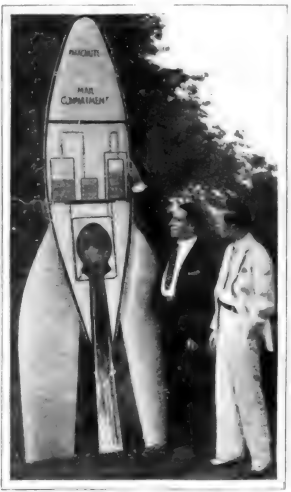
The latest daring air stunt, picking a handkerchief from a field with the wing of an airplane flying at great speed, is here being demonstrated at Los Angeles by its originator, Major Ernest Udet, World War ace and noted stunt flyer.

New 900-Mile-an-Hour Rocket Will Test Stratosphere Gas

PLUNGING through the air at 900 miles an hour, a rocket will be shot into the stratosphere late this fall to bring back to earth samples of high altitude gases.

From these gases scientists hope to obtain much valuable information about the composition of the upper layers of the earth's atmosphere. The data obtained will also be applied to the study of meteorology.

Ernst Loebell and Edward Hanna, research engineer and secretary of the Cleveland Rocket society, plan to build the rocket and send it aloft this fall. The stratosphere rocket will ascend 10 miles in 40 seconds. When its fuel is spent, it will return to the earth by parachute. The parachute will be stored in the nose of the missile.



Plan of rocket that will shoot up into stratosphere and return to earth with samples of gas is shown in this photo.

Moon Rocket Would Carry 10 Tons

FOR $100,000,000 a passenger-carrying rocket could be built to make a round trip to the moon with a ten ton payload, in the opinion of W. A. Conrad, assistant professor of mathematics at the United States Naval Academy at Annapolis.

Prof. Conrad said the biggest problem of the rocket project would be a necessary fuel load of 6,000 tons. He explained the rocket passengers could sail around the moon taking pictures. A small amount of fuel would start the rocket on its return trip. When the rocket neared the earth, the passengers could escape with parachutes, he said.

Weather Controls Gasoline Meter

Price of gasoline is determined by temperature in the new specific gravity meter on the right. Above —A close-up of the meter showing the correct temperature readings and price.

TEMPERATURE determines the price of gasoline in a new meter intended to save motorists $300,000,000 annually in this country. The new meter corrects the present system of selling gasoline by volume. Gasoline bought during warm weather produces less miles per gallon than gas purchased during cold spells due to expansion of the fuel as temperature increases. Charles H. Kirby, of Bellingham, Wash., invented the new meter which is based on specific gravity of gasoline.

Table Server Saves Ice Cubes

DESIGNED to keep ice cubes from freezing together, a table server has been marketed with a separate compartment for each cube. Its manufacturers claim ice will melt less quickly in the server than in the ordinary pail or dish.

This server holds 18 ice cubes in separate compartments.

Plan Your MIDGET Farm

Are you one of the millions of people who are dreaming of going back to the land—having a little farm of your own where you can earn a modest living and be free of depression worries? If so, begin planning now, following the advice given here by an expert on midget farming.

AS a part of the new deal he is giving the American people, President Roosevelt recently signed an executive order setting aside $25,000,000 to aid in the establishment of thousands of midget farms whereon depression-tortured city dwellers could find refuge from the hardships of unemployment.

Weary of the dirt and noise and despair of the cities already, however, thousands of families have joined this back to the land movement, finding the semi-rural life an ideal mode of living.

Most of these small farm enterprises are carried on within commuting distance of town and city where the head of the family works. With part time employment, or small income, the "hard times refugees" are getting a comfortable partial subsistance off plots no larger than 150 by 300 feet, or perhaps only on the rear end of a large lot.

Not only do the small plot farmers find their new avocation a solution to the depreciated income problem, but they also find a keen thrill in the enterprise. It's a high exhilaration that comes when you walk out into your yard, filling your lungs deeply with trenchant morning air, look over your "estate," and realize that you are an independent producer of a part of the world's food supply.

If you're planning on taking up midget farming as a solution to your financial troubles, the fall, or, at latest, in early winter, is the time to begin. Prepare your garden during these aforementioned seasons. Long ago I learned that the real gardener studies his seed catalogues months and months before he begins to plant.

Agriculture experts have developed midget farms in a balanced way, with all of the food producing units taken into consideration; that is, fruits, berries, vegetables and poultry. On these pages you will find a model plan which happens to fit southwest conditions, but the varieties suitable for your section can be substituted.

The following tricks will save many dollars and backaches, as well as promote efficiency in your particular plot. They are not intended to give complete instruction in planting and caring for the garden, but they do present a cross-section of many experiences.

For flooding, I have found two methods useful and economical. First, take a T-joint of pipe, of a size to fit the hose coupling (Fig. 2). Screw the joint onto the hose, then wrap a heavy cloth loosely around the joint. This permits you to turn the water on full force, yet the T-joint and the cloth break the force and prevent washing.

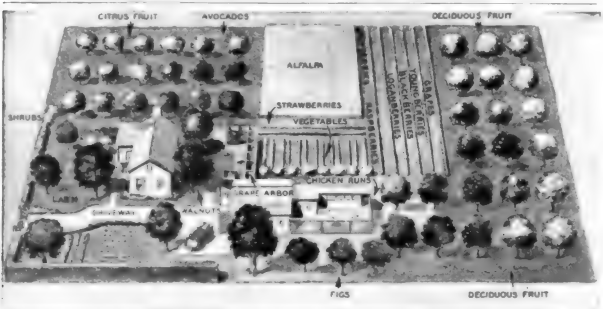
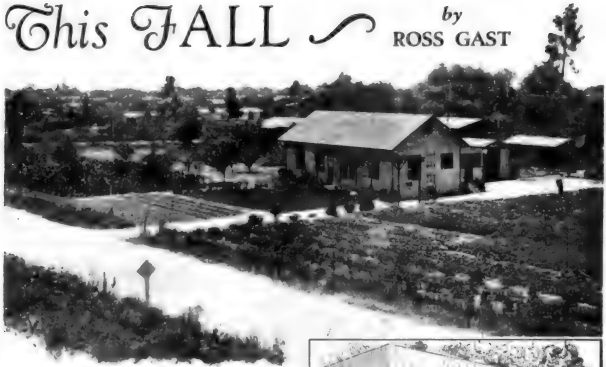


Fig. 1. How would you like to live on a midget farm like this, with an abundance of fruits, vegetables, and chickens to eat and sell? This ground plan has been adopted by thousands of Southern Californians as the most satisfactory arrangement.

This FALL

by ROSS GAST



Doesn't this photograph of a typical midget farm send a new thrill coursing through your nerves? Orchard is at left, vegetables at right, and chickens run in the back yard. Located close to the city, the farm permits the head of the family to commute to work and live a healthful farm life after hours of labor.

To distribute the water into furrows, cut two slits in an open gallon can, opposite each other, and run the end of the hose into the can. By placing the can properly, the water will run into the selected furrows. (See Fig. 3.)

Another useful method of distributing water in the garden is a miniature wooden flume and berry-gate. Here (Fig. 3) you need only five pieces of redwood, 1" by 6", with the berry-gates spaced about three feet apart.

Use of Compost Bin

You can purchase the gates cheaply at any hardware store. They are set over one-inch holes bored in the flume. Flow can be regulated by adjusting the height of each gate. By setting a gate wherever desired, you can divert water into the desired rows. Such a flume costs about 10 cents a foot.

The coming autumn and winter months is the time to prepare for the better garden next spring. You will find the compost bin valuable. Such a bin not only makes for a cleaner garden, but provides also much valuable material for fertilizing and mulching.

A bin about eight feet square and about 4½ feet high, placed out of the way in the corner, will serve the average gardener well. While earth floors are common, it is generally best to use concrete.

Throw in everything of an organic nature plant refuse from yard and garden, wastes from the kitchen. Keep the mass wet and add slaked lime occasionally to hasten decomposition.

During late fall and winter, unless the

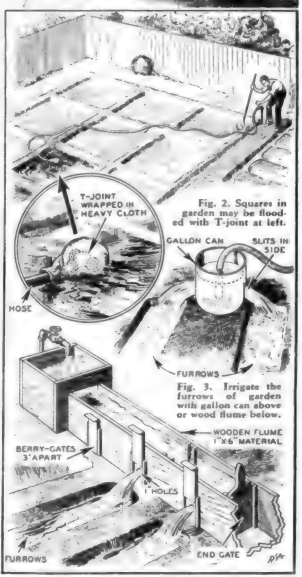


Fig. 2. Squares in garden may be flooded with T-joint at left.

Fig. 3. Irrigate the furrows of garden with gallon can above or wood flume below.

Ideas for effective watering systems are outlined in these drawings. T-joint proves highly efficient in small gardens.

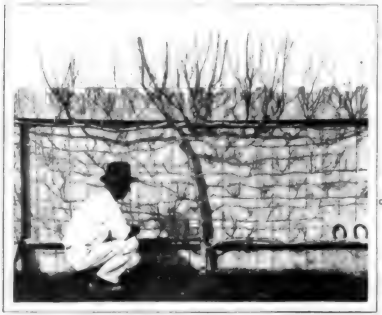


Fig. 4. Expert orchardists advise you to train fruit trees on a wire trellis of the type illustrated here. Limbs can be made to grow into position most convenient for picking and most effective for production of large crop.

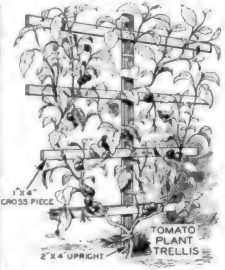


Fig. 5. Tomatoes get maximum exposure to sunshine on this trellis.

ground is frozen, you should begin preparation for the garden by spading, thus turning into the earth any plant foods. When ready to plant, this simple method for flooding will be found valuable:

Make beds about 4 ft. by 6 ft. square (Fig. 2), using either hoe or hand plow, with borders some 8" high. Using the T-joint previously described, fill each check at least once. If very dry, fill them three or four times.

Best Irrigation Methods

This procedure will insure penetration of the water to a depth of at least two feet, a condition which aids in rapid germination of seed and steady development of plants.

After the flooded soil is in a condition to work, break down the checks and spade or plow but wait a week before planting, to give the soil's moisture-content opportunity to spread uniformly.

In the west, the common way of planting vegetables is on double rows or raised beds. This practice, developed by commercial growers, may be used for many of the most popular gardening vegetables in the east, especially for the very early plantings. The double row (Fig. 8) calls for the planting of two seed rows on a ridge or raised bed, one row on each shoulder of the furrow making up the beds.

Under this system, the plants are sure of good drainage and the opportunity of making the best of the limited hours of sunshine in early spring. Excess moisture from early rains is carried off by the furrows.

To make up the double rows, you need only hoe, rake and garden line. For most

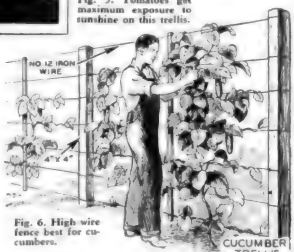


Fig. 6. High wire fence best for cucumbers.

Fig. 7. Plant trees in straight rows with this notched board. Left—How the young trees are set out.

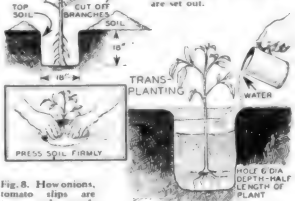


Fig. 8. How onions, tomato slips are transplanted. Spread out roots well. Water the fill thoroughly, then press in soil so it comes flush with surface of ground.

Planting Vegetables in These Raised Beds Found Best in Arid Regions

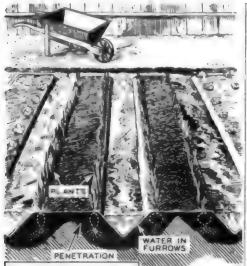
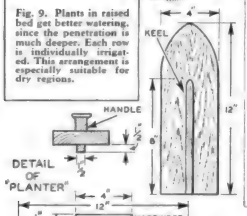


Fig. 9. Plants in raised bed get better watering, since the penetration is much deeper. Each row is individually irrigated. This arrangement is especially suitable for dry regions.



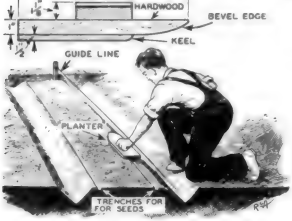


Fig. 10. How trenches are laid out for planting the raised beds. Keels on the planters may be of varying depths for various kinds of plants. Trenches are about 10 ins. apart.

Fig. 11. Showing how raised beds are prepared by hoeing furrow.

crops, make the furrows 30 inches apart, center to center. (See Fig. 9.) Here are the details:

Cut a stake 30 inches long. Shorten your line to the length of the plot. The line will serve as your guide. Starting now on one side, measure off successive thirty-inch widths with your stick, setting stakes along this line at those intervals.

Of course, you walk backward when hoeing. Now, standing on the right side of the guide, plunge the hoe into the soil with the cutting edge away from the guide. Pull the soil out sharply away from the guide, depositing it so it will not bunch up ahead of the hoe. This opens a half furrow.

When the half-furrow is entirely opened, move the guide back to the edge of the plot and draw another half-furrow similarly, throwing the soil in toward the half-furrow already made. Your first raised bed is now completed.

How to Plant

Similarly you complete additional furrows, at last levelling the top and removing larger clods with a rake and planting along the edge. Your raised beds should measure about 14 inches across.

Now we are ready to plant. Planting time, next to harvest, is the most enjoyable period of the garden year. While planting varies according to the crop, the common garden vegetables fall into several major groups, each group requiring similar handling.

For instance, the crops planted in double rows include carrots, turnips, beets, parsnips, radishes, lettuce, spinach, celery, mustard, Chinese cabbage, onions and several others, all of whose seeds are rather small. Back-breaking task, this planting. But here's a device to save time and trouble.

Anyone can make a "planter" in an hour

(Continued on page 122)

Miniature Roller Coaster Is Thrilling Fun for Youngsters

Youngsters starting out on 50 ft. ride over wavy miniature roller coaster which gave the riders the thrill of their lives.

ONE of the chief attractions for the youngsters at a children's garden party held recently in London was a miniature roller coaster that gave the kids all the thrills of its big brother at the public parks.

The car of the miniature roller coaster rides on four small wheels, and is so constructed that the youngsters can sit astraddle and hold on by a couple of knobs on the front.

A breath-taking speed is developed along the undulating tracks, even though height at the start is only about four feet. A slight shove sends the rider dashing along the tracks for a ocean wave ride of fifty feet or more.

Latest in Radio Treasure Finders

GOLDEN treasures buried in the earth long ago by misers, pirates and thieves cannot hold out much longer against the swarm of radio treasure finders that are now scouring the countryside.

Two of the latest instruments to appear are pictured in action below. At left is the highly efficient Metalloscope, which amounts to a miniature radio transmitting and receiving set that projects waves down into the earth to locate buried metal. Public utilities companies are making wide use of it to locate old pipe lines, etc. At right is treasure finder developed at California U.

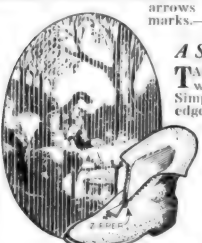
Left—New Metalloscope which locates buried metal by projecting radio waves into earth. Right—Men are digging where the finder says there's treasure.

HANDIKINKS for Everybody

Save time and labor by consulting these pages when you have a difficult job on your hands.

Parachute Arrows Sail in Air

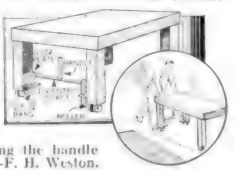
ARROWS fitted with parachutes are new and novel toys that can be made by any boy. The arrows can be shot some distance and will float lazily to the ground. The arrow is made of a strip of wood about an ⅛ inch thick. Cut the shaft about a quarter inch wide and carve the blunt bottom end approximately an inch wide. The parachute can be made of a circular piece of silk, six inches in diameter. At even distances around its edge fasten threads long enough to be attached to the arrow shaft and leave the parachute free of the arrow. A more elaborate parachute can be made by sewing together narrow triangular pieces of cloth. The sling is simply a shaft of wood to which is tied a piece of cord knotted at the end. This knotted end slips into a notch in the arrow. The arrow is shot into the air with a quick jerk of the right hand as the left releases the parachute arrow. Many games can be played with this toy. Boys can have contests to see who can shoot the greatest distance. Circles may be drawn on ground and contest held to see who can drop arrows within the marks.—R. T. Dunn.



A Safety Pocket Made From Old Overshoe Zipper

TAKE the zipper from an old overshoe to make a pocket that will be a safe place to keep valuables on camping trips. Simply remove the zipper from the overshoe and sew it to the edges of the pants pocket. If the zipper is longer than the pocket opening just start stitching the zipper on the pant leg below the pocket. With the zipper pocket closed there is no danger of losing money or other valuables from the pocket. Old overshoe zippers can also be used in other ways by the camper. They may be fastened to cloth or canvas bags for efficient, handy openings that will stay shut when closed.—E. L. MacFarlane.

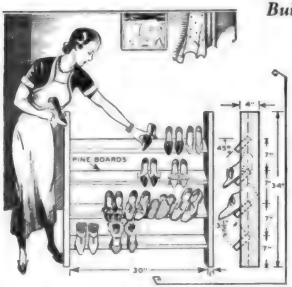
Making Movable Work Bench Rigid



MOVABLE work benches have the disadvantage of rolling or shifting. To prevent this the contrivance shown in the drawing on the right was tried and found practical. Iron bars are slipped over the eccentric shaft which is bent at each end to give sufficient "throw" to raise the rollers off the floor. The substitute iron legs, that make the table rigid, pass through steel guide plates as shown. By pulling the handle the shaft revolves forcing the iron legs to the floor.—F. H. Weston.

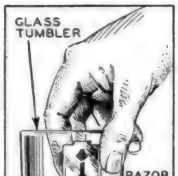
Ingenious Kinks for Handymen

Build This Shoe Rack for Your Home



THE shoe rack, shown in the drawing at the left, is easily built and takes up little space. It can be hung on a closet door or placed against a wall. The rack will hold sixteen pairs of shoes. A line is drawn down the center of the 34-inch 1x4-inch boards. The half-inch pine crosspieces are spaced seven inches apart along this line. The racks are set at a 45-degree angle and held in place by screws.—Roland A. Fletcher.

Tumbler as Razor Hone



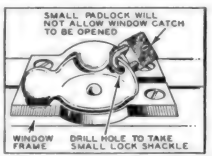
SHARPEN dull razor blades in an ordinary drinking glass. The inside of the tumbler has the correct arc for putting a good edge on the usual type safety razor blade. With the forefinger pressed slightly against the blade and the thumb on the outside of the glass, move the blade up and down about fifteen times. Turn the blade over and sharpen the other side the same way. The result will be a keen-edged razor. The life of a razor blade can be lengthened several weeks by this method.—C. E. Avery.

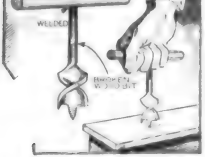
One Bait for Two Mouse Traps

ANNOYANCE of baiting mouse traps daily led to the construction of a single bait box for two or more traps. The bait will do for days as the mice cannot reach it without being caught. Cut holes in a cigar box. At each entrance fasten an ordinary trigger trap to the box with a screw. Attach a fish hook to the inner side of the lid to hold the bait. The mice spring the trap before they get a chance to nibble away any of the bait.—G. E. Hendrickson.

Padlock Makes Window Latch Burglar Proof

HOMES can be protected from burglars by a simple method of padlocking ordinary window latches. Should a burglar cut a small hole in the window pane, he will find it impossible to turn the latch with the padlock in place. Drill a small hole in the turning part of the window catch as shown in the drawing on the right. Slip the shackle of a small padlock through the hole to lock the window.—John Wassom, Jr.





Broken Wood Bit Makes Handy Shop Tool

BROKEN wood bits can be used to make handy tools for the workshop. The tools can be used for starting lag screws and drilling shallow holes where a brace cannot be used. Cut off the shaft of the drill with a hack saw. At right angles to the shaft weld a short length of 7/16 inch steel bar. The bar serves as the handle. Grasp the handle and press down on the bit, turning it to drill the hole. Bits of various sizes can be used to make several tools.—J. W. Bentley, Jr.

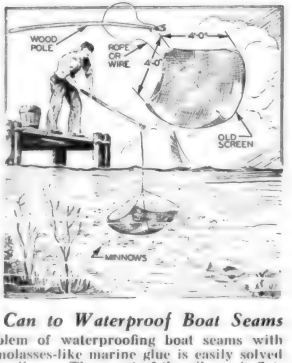
Helpful Items for Outdoor Men

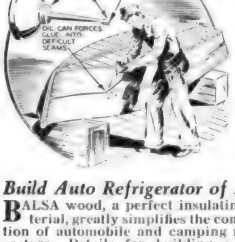
Minnow Seine Made of Old Screen

THE fisherman who finds himself out of live bait can quickly improvise a minnow seine from a piece of screen wire.

A screen about four feet square will do. To each corner attach string or rope and bring all four pieces to a bridle at the center. Tie a length of cord to this bridle and to the end of a wood pole. Lower the seine into the water. A quick jerk will usually bring out a handful or two of fine minnows.

The seine can be carried as part of the fisherman's regular equipment. It is easily rolled up and always ready for use. A pole can be improvised from the bough of a tree or an old stick found near the fishing spot.—G. J. Hansom.





Use Oil Can to Waterproof Boat Seams

THE problem of waterproofing boat seams with sticky, molasses-like marine glue is easily solved by using an oil can. The spout of the oil can is flattened out so that it will work into the seam and permit the glue to flow through it. The glue is forced through the spout through the bellows action of the bottom of the oil can. This method of waterproofing seams is much simpler than attempting to force the glue into the seams with a stick or paddle. Oil can forces glue evenly into recesses.—C. L. Urban.

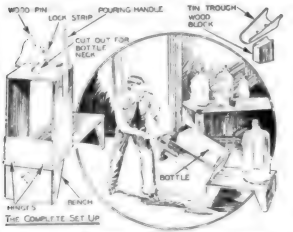
Build Auto Refrigerator of Balsa

BALSA wood, a perfect insulating material, greatly simplifies the construction of automobile and camping refrigerators. Details for building a Balsa wood portable ice box are shown in the drawing at the right. Complicated double walls are not necessary. The box also has the advantage of being considerably lighter than the usual type. The corners of the box are mortised and the cover overlaps to provide airtight construction. The ice container can be made of copper or galvanized iron, but, if the builder wishes, he may use a two-gallon oil can to hold the ice. An imitation leather covering will give the refrigerator a neat finish. Dimensions of the box depend on the space available.—Wilbur J. Brown.

Bottle Caps Make Effective Fish Scalers

ORDINARY crown bottle caps fastened to a piece of wood provide the camper or housewife with a simple, yet effective, fish scaler. Carve a piece of half-inch wood into the shape of a paddle. Punch a hole in the center of the caps and fasten them to the wood with screws. A washer placed between the screw and the cap will lengthen the life of the scaler. The scaler can be made with any number of caps, depending on the size of the fish on which it is to be used.—Clair L. Wade.

Simple Stunts Save Time, Effort

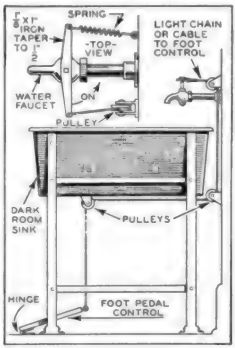


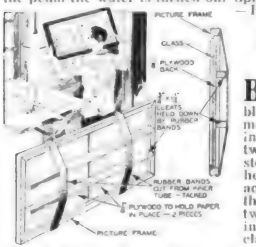
Pouring Device for Large Bottles

POURING water or chemicals from large bottles is a simple task with the device shown in the drawing on the left. The bottle is held firmly in a box hinged to a bench. The neck of the bottle slips into a slot cut into the upper end of the box and is kept in position by means of a strip of wood held by a wood lock pin. A tin trough fastened to a block attached to box fits against mouth of bottle.—F. Buss.

Pedal Control for Darkroom Faucet

A FOOT pedal control for the darkroom faucet was devised to prevent spoiling prints and negatives with chemically soiled hands. Washed hands often pick up "hypo," or other chemicals from the faucet handle and at times spoil a good photo. Arrangement of the pedal control is shown in the drawing on the right. The faucet handle is removed and replaced with a piece of iron or steel. In the center of this a hole is drilled and filed square to fit over the faucet. The cable from the pedal is fastened to one end and a spring to the other. By stepping on the pedal the water is turned on. Spring shuts it off. —R. F. Thompson.



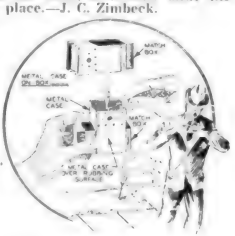


Simple Blueprint Frame

BLUEPRINTS can be made in an ordinary picture frame fitted with a back to hold the tracing and blueprint paper in place. The back of the frame is made of ¼-inch plywood cut to slip easily and snugly into the back of the frame. The back is divided into two parts. The two clamping pieces of ⅜ x 1¼ inch stock are not fastened to the back. Two pieces of heavy rubber from an old inner tube are stretched across the frame and fastened to the outside. To use the frame slide the clamping sticks out and then the two back pieces. Put the tracing and blueprint paper in the frame, then the back, and lastly slide the clamping sticks in place.—J. C. Zimbeck.

Metal Case for Lighting Matches in Wind

BURNT fingers and palms from lighting matches in a high wind can be prevented by constructing a simple metal case for the match box. The box fits lengthwise into the case. When used in a high wind, the box is slipped out and put into the crosswise slot. The guard of the metal case provides a place to strike the match and protect the flame from the wind. Holes in the metal supply air for the flame. The metal case is made from a single piece of tin or aluminum. Using a safety match box for a guide, mark off one long piece, turn the box on its side to measure the narrow interconnecting strip, then set box flat for another long piece and finally rule off the second narrow strip. Form the case and solder. H. F. Kutschbach.



Novel Ideas of General Interest

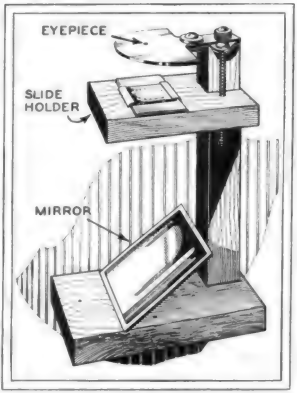
Microscope Simple But Powerful

MAKING a microscope sufficiently powerful for amateur purposes isn't so difficult and expensive a job as you might think. Take the little microscope in the drawing at the right, for instance.

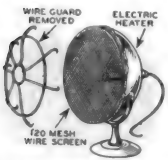
All you need to make it is a few spare parts you can easily dig up from your workshop junk heap. The base is a piece of scrap material about an inch thick, two inches wide and six inches long. The slide holder is half inch thick material. The upright an eight-inch piece of 1x1.

To make the eyepiece simply cut a piece of sheet brass or copper into a half moon with a projecting lug. Bolt this lug to the top of the upright. Another lug on the top of the upright is bored with a hole for a knurled knob which is twisted to lower and raise the stage.

The magnifying lens is simply a pinhole punched in the half moon of brass, the hole being filled with a drop of water. When an object is placed on the glass slide, and the mirror focussed on the hole under the slide, you'll see many strange things you never dreamed existed before.—Donald Mazzon.



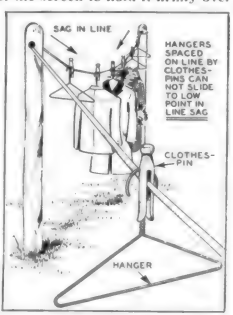
Heater Guard for Baby Hands



THE open wire guard on an electric heater is quite often ineffective when it comes to the task of keeping little children's hands away from the heating element. This situation can be remedied, however, by removing the guard and replacing it with a disc of 120 mesh screen, as illustrated in the accompanying drawing. A length of No. 18 wire can be wrapped around the edge of the screen to hold it firmly over the face of the heater.—Melvin Gregor.

Clothespins Help Dry Suits

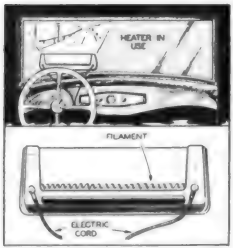
EVERY housewife knows how exasperating it is to have clothes slide down a sagging line and bunch up together in the center. With the suits, coats, and so on, ganged up together, very little drying is done. What to do about this? Simply do as the drawing at the right instructs.—Walter Brixius.



Mystery Window Sign Gets Attention

GROCERS, druggists, and others who paint signs on their windows to attract attention will welcome this little ad stunt. The advertisements, that is, list of specialties for the day, are painted on cellophane, as shown in the drawing at left. This cellophane sheet is then pasted on the window, and over it is cemented, temporarily, a sheet of window glass. This holds the sign firm and gives you distinctive letters.—Chet Sullivan.

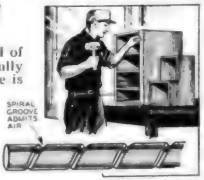
Take Drudgery from Common Tasks



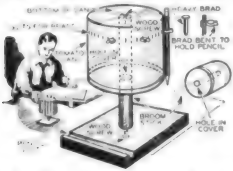
Heater Keeps Ice Off Car's Windshield

OLD Man Winter is approaching and so you'll want to be prepared for icy windshields. Here's an electric heater for the job. The filament is a length of nichrome wire which you can purchase at any hardware store. This filament is housed in a metal form which can be of any design you wish. Ends of the filament attach to binding posts at the end of the metal housing, and lead thence to the battery. When the juice is on, the ice trickles down the windshield in a stream of water, permitting a clear vision. —Jim Dasson.

Spiralled Dowel Holds Tighter



THE ordinary method of gluing dowels is really not very efficient—here is a much better way. Before the dowel is inserted in the hole prepared for it, spiral it with a groove in the manner illustrated in the accompanying drawing. This admits glue to sections which would ordinarily be rubbed bare. In addition the groove admits air, permitting the rod to be inserted to full depth. The spiralling can be done with a sharp knife or a chisel.—Dexter Massers.

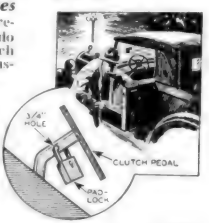


Handy Pencil Holder From Coffee Can

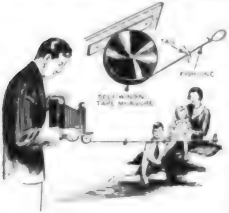
A REALLY handy pencil holder will prove a godsend in any drafting room, and the holder shown here is just the thing for the job. It holds any number of pencils and has them always handy. The chief part of the holder is a coffee can, which has punched around its sides a number of slits for brads. When these latter are stuck through the slits they are bent to get a grip on the pencils as shown in the drawings. The bottom of the can is supported by a broomstick extending down through a hole in the cover to stand, held by a screw, on the baseboard.—Vince Barnett.

Padlock on Clutch Pedal Baffles Auto Thieves

SIMPLICITY itself, this little burglar "preventer" will forestall the most determined auto thief. All you have to do to construct the "preventer" is bore a small hole in the clutch lever of your machine and through it slip a padlock as illustrated in the drawing at right. When the potential thief steps on the clutch pedal in the process of making away with your car, he will find himself thwarted. He simply can't bear down on the clutch pedal, no matter how hard he tries. A lock with a large body is what is needed in this case.—Daniel Lionsden.



Tapeline for Better Photos

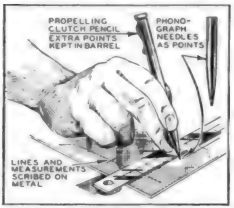


TO BE sure that the distances you set your camera are correct, so that images are sharp and clear, measure off the space between camera and subject with a line calibrated with tags as illustrated at the left. Put the line in a self-winding tape measure box by tying the end of it at the end of the tape measure. Mark off the line in feet, then set the scale on the camera according to the footage measured off on the tapeline.—James Dinnimore.

Labor-saving Workshop Aids

Grease Cup Serves as Paste Soap Dispenser

BRASS grease cups to dispense paste soap will be found very efficient for the workshop. The dispenser eliminates the usual unsanitary method of dipping the hands in the soap can container and mixing grease and dirt with the soap. Make a bracket of one-inch flat iron. Drill and thread a hole for the grease cup and drill two holes in the other angle to fasten the bracket to the wall. Put the bracket up above the sink. Fill the grease cup with paste soap. A slight turn will force out a generous amount of soap. The dispenser has the advantage of keeping the soap clean. It also prevents waste and keeps the paste from drying. The grease cup should be large enough to hold sufficient soap for several days. If the cup becomes clogged, it can be removed easily and rinsed with water. Put soap into cup with wooden paddle.—A. S. Wurz.

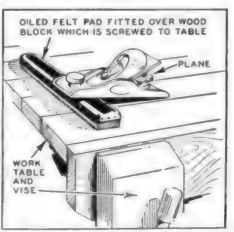


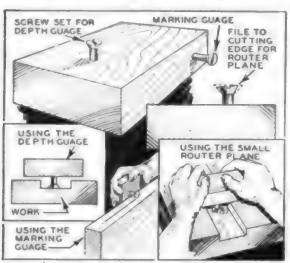
Old Needles Used In Metal Scriber

OLD phonograph needles and an automatic pencil make a very good scriber or marker for the mechanic or sheet metal worker. A phonograph needle replaces the lead in the pencil. By turning the screw device of the pencil the needle can be pulled out of sight to assure a sharp point at all times. Extra points can be kept in the barrel of the pencil. The tool can be used by draftsmen for pricking drawings and tracing fine lines.—A. G. Henry.

Bench Pad Oils Plane and Saves the Bit

TO SAVE the bit and oil the plane at the same time a padded block should be fastened to the work bench. The block eliminates the necessity of turning planes over on their sides to protect the bits. A wood block of adequate length is screwed down near the end of the table. Felt is tacked over this. The pad is then soaked with oil. The block holds the plane up, protecting the edge of the bit. After a plane has been used, it is drawn across the oiled pad and allowed to rest with the toe on the pad. The film of oil protects the sole from rust and makes the plane work more easily.—Wilbur J. Brown.

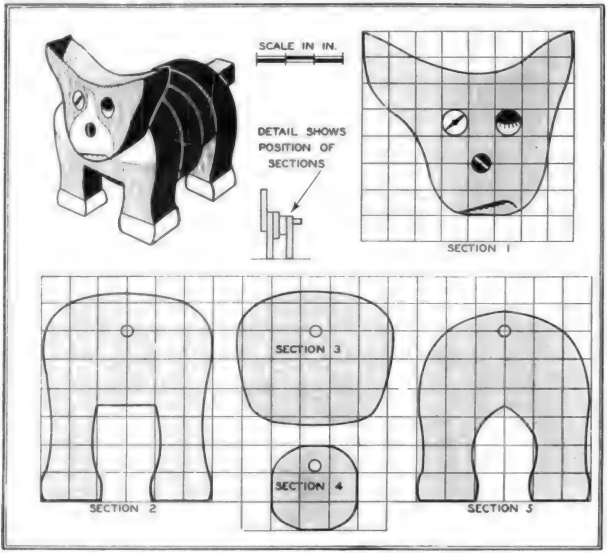




Screws and Block Form Three Tools

A ROUTER plane, a depth gauge, and a marking tool, three handy tools in one, can be made with three wood screws and a block of wood. A wood screw is placed in the block at a height equal to the depth of the groove to be routed out. The head of the screw is filed, as shown in the drawing at the left, to make a sharp cutting edge. The screw set for a depth gauge is put into the opposite side of the block. The marking gauge screw is set in the side of the block, the edge of the screw head acting as the marker. In using the router, the groove may be chiseled out slightly or the router used immediately.—A. E. Nichols.

"Floozy Fido" is Unique Ornament



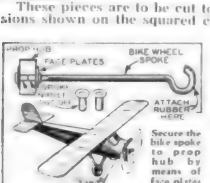
"FLOOZY FIDO," who stands around half asleep most of the time, will make an amusing ornament to your den, living room, or what have you.

He always looks as if he had a bad hangover, but he's good fun just the same. Four pieces of scrap lumber about one and a half to two inches thick will make up his various elements.

These pieces are to be cut to the dimensions shown on the squared charts above. You can use your own proportions, making him as big or as small as you want.

When you've got him scroll-sawed out, join all the sections with a dowel rod, bringing up the rear with a short section of one by one, which is bored and glued to take the dowel rod.

Floozy Fido's nose is nothing more than a screw that enters the front end of the dowel rod, tightening all the sections up into a compact unit.

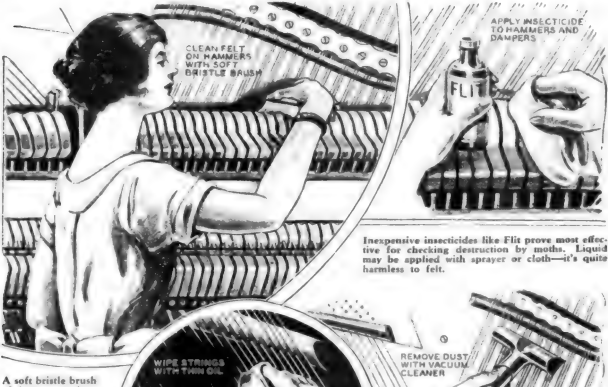


Secure the bike spoke to prop hub by means of face plates and bolts.

Prop Shaft for Model Plane Band Motor

MODELMAKERS wondering about the best way to hook up their rubber band motor to the props on their model planes will find the stunt illustrated at the left just the solution to their problems. The nipples are cut off according to the thickness of the prop, and through them is inserted the threaded end of the bike spoke. Copper washers as face plates keep the bolts from biting through the wood. Bend the end of the spoke into a hook to take the rubber bands, which constitute the motor of the plane.—Marvin Dogney.

HOW to CARE for YOUR PIANO



A soft bristle brush of the type used on hats proves best for cleaning dust from hammers and dampers of your piano. Brush gently, so that hammers are not forced out of line. Right — Rust may be prevented most effectively by means of an application of light oil with a cloth. Rust already collected can be removed by gasoline, followed by oil.

Inexpensive insecticides like Flit prove most effective for checking destruction by moths. Liquid may be applied with sprayer or cloth—it's quite harmless to felt.

Occasional use of vacuum cleaner will keep piano innards free from dirt. Remove front before cleaning.

FOR some strange reason the average mechanic, however clever he may be in turning 3-throw crankshafts or fluting a Chippendale leg with an old file, is just a little afraid of his piano. To make matters worse, the average housewife does not clean the inside of a piano frequently enough and things begin to happen—moths, rust, dirt, and so forth.

The best way to remove dust from the felt covering the hammers and the dampers (below the hammers) is by use of a brush. However, it must be the right kind of a brush and by no means should a whisk broom be used. It has been found best to use a very soft brush—a brush similar to those employed in brushing hats.

The reason that moths get into pianos, outside of pure neglect, is that the felt covering for the hammers and dampers is an extremely pure form of wool and is therefore a rather delicate morsel for this destructive insect. The free use of the proper insecticide will check the destruction.

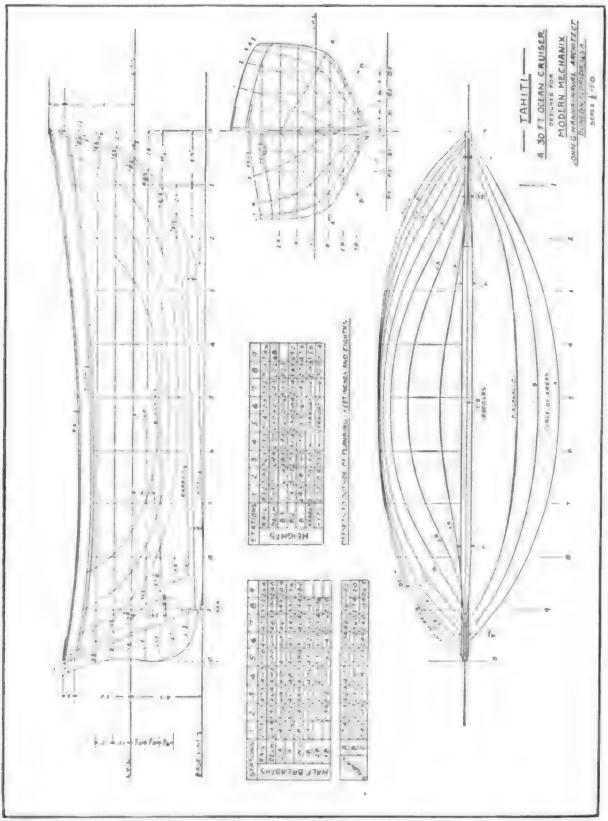
For all ordinary use any of the cheap insecticides on the market like Flit may be used to keep a piano free of moths by regular application, say once every two months. It may be applied with the conventional sprayer for it is quite harmless.

Rust is the next thing to battle in a piano. In real damp climates near the sea and other large bodies of water this is a problem. The only method that can be used successfully is that of making use of thin oil to cover the metal parts, especially the strings and the pegs.

Notice in the drawings that thin oil was specified. By a thin oil the writer refers to something of the nature of 3 in 1 which is light enough so that it will not gum. A small rag soaked in this oil may be used to wipe off all of the strings and indeed all metal parts.

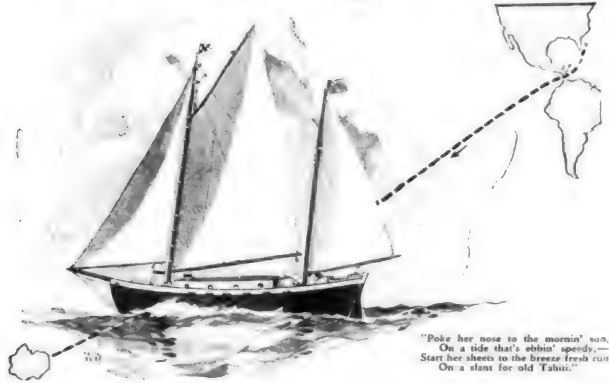
If rust has already invaded the piano, the mechanic should use gasoline to remove it and then go over metal parts with the thin oil.

PLANS for "TAHITI"



This is the best design Modern Mechanix and Inventions has ever published, considered on a basis of dollars and cents adequacy. Tahiti's beautifully powerful lines show the symmetry only a highly experienced designer could produce. She is the best of Hanna's string of designs. Lines are given to outside of planking, and are expressed in feet, inches and eighths of inches. Laying-down lines instructions will be run in later issues of Modern Mechanix and Inventions.

a SAILING CRUISER



"Poke her nose to the mornin' sun,
On a tide that's ebbin' speedy,—
Start her sheets to the breeze fresh run
On a slant for old Tahiti."

by JOHN G. HANNA

A he-man's boat is Tahiti, whose plans our fans have been clamoring for. Here Jack Hanna gets us started on her, and tells of the years of breeding in her splendid pedigree.

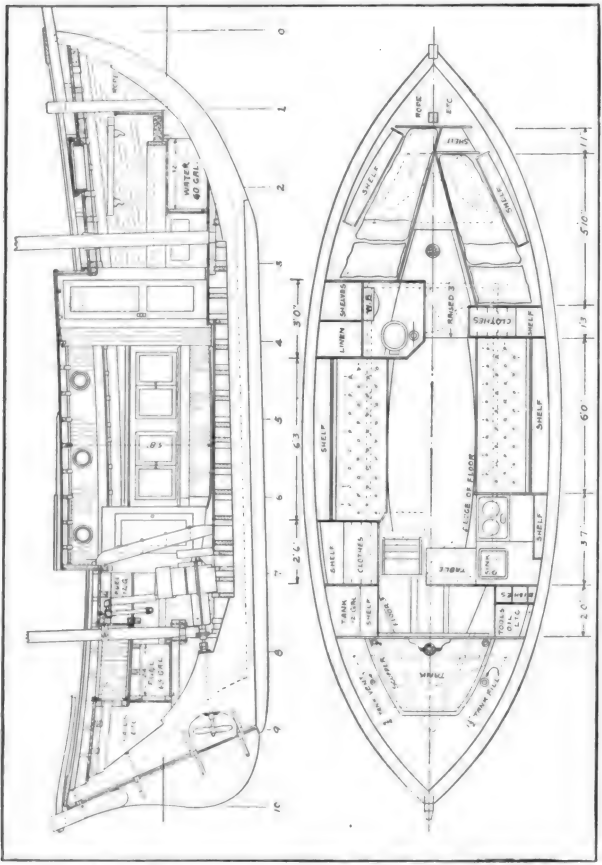
THE urge to go places and see things seems to be afflicting M. M. readers in a big way. Every time we publish plans of some little power cruiser we get a bunch of letters from the cash customers, saying they are intending to go around Cape Horn or down to Honolulu or up to Alaska in that boat, and asking what changes can be made to make it suitable and safe for such a voyage. The answer is, absolutely none. You fellows from Nebraska, Kansas and thereabouts may not realize it, but Old Man Ocean is a very different party from the Mississippi river, and when he gets rough, no light, cheap little motor boat ever is going to have a ghost of a chance with him. That's a fact, and there is absolutely no way around it. For such journeying you need a SHIP—a small one, indeed, but a real ship. And I'll tell you why.

Neptune's Free-Air Service

The main reliance in crossing any ocean in a small boat is, and always must be, Free Air, and not the Standard Oil Co. Simply because the smaller the boat, the relatively greater the fuel consumption—a natural law there is no way to beat. Some of the boys figured that 500 or 750 gallons would push a boat like *Dorothy* across the ocean (forgetting, of course, that head winds and mountainous seas would slow her down to almost nothing at times) so all they had to do was put in that amount of fuel. They failed to figure that such a quantity would need tanks filling the whole cabin and leaving no place to sleep or eat, and that its weight of two or three tons would sink the little boat before it started. You see that idea is all phooey.

On the other hand, while several small boats have gone clear around the world with sail only, handled by only one man at that, it would be foolish to dispense with an engine, which is an invaluable aid at the only time you are in any real danger. That is, in making your landfall and entering ports. You are never in any danger in a good boat on the deep sea. Just as it is not the take-offs nor the flying, but the landings that crack up airplanes. Harbor entrances are usually narrow and crooked, and if the wind is against you, and the tide going out too, you would be in real danger trying to sail in. That is the proper use of the engine in a small ocean cruiser—entering ports, and possibly emergency aid in clawing off if you are careless enough to get too close to a dangerous coast. And a

Inboard Profile and Accommodation Plans Show Tahiti's Great Room


WATER 40 GAL.
FUEL 40 GAL.
SHELF
CLOTHES
SHELF
SHELF
SHELF

Here's a Tahiti anchored in a cove in the Dry Tortugas. This photo shows her fine freeboard, powerfully flaring bow, the symmetrical stern quarters. The ketch rig is the one best rig for single-handing it, as it's a rig that'll balance under all conditions. Jib and mizzen, main s'l alone, or all three under double reef will let her sail herself.

liberal allowance of fuel for these purposes is enough, and all you should attempt to carry.

Sailing Not Difficult

Now just a few words to you grease monks. Don't get cold feet because you don't know how to sail and are afraid you can't learn in less than several years. Sailing is one of the simplest arts known to man. It is far simpler than flying, since you have one control, not three, to handle. And plenty of airmen have gotten their licenses after less than 24 hours actual practice. I can teach you absolutely all there is to sailing a boat like *Tahiti* in half an hour. For the rest, it is simply a matter of practice, attention to the job, and plain ordinary common sense. Try a little of this and a little of that, and you quickly learn just what adjustment of your sails will give best results in any given weather. Keep a weather eye open for squalls, and lower part or all of your sail in time. There are plenty of books that will tell you all the useful little tricks and all the wisdom of old sailors. Believe me, you'll find it the most fascinating sport in the world, and far easier than it is to handle the 57 kinds of trouble that afflict gasoline engines.

Such being the general requirements, you will want to know why the editors selected this particular design instead of many other possible 30-footers. Well, a boat with a sharp stern—both ends pretty much alike—commonly called a double-ender—is the most seaworthy possible form. More boats of this general model have been used, by all the nations of the world, for several thousand years, than all other forms combined. Every nation has developed its special types. This design, however, is not a Norwegian type, or a Greek type, or any other type. Before starting the plans, I spent several months in study and analysis of all the world's double-enders, and selected the best features of each for our needs. So *Tahiti* may not be the best double-ender for cod fishing in Norway, or for Greek sponge fishing, but she is the best for cruising with maximum comfort and safety, with minimum effort and risk, from here to any given point at the other end of any man's ocean.

Design Thoroughly Tested

The editors, however, being from Missouri, did not take any say-so for this. The design has been built, tested, put up against real deep water and dirty weather, and proved good.

Not one boat, but five of them. Not by one man, but by many skilled sailors and competent judges. Not in just one place of favorable conditions, but in the Atlantic, Gulf, Chesapeake Bay, the Great Lakes, and even in that hell of bad weather, the North Sea, off England's coast. Not in one pleasant summer, but in all weather as it comes for six years. I put the first one through her paces myself, sometimes with one man, sometimes handling her alone. Everything the owners of the others have reported to me has simply confirmed my observations, or gone farther. She is dry; that means she stays on top of the waves, and does not tend

"I Saw Strange Harbors Overseas"

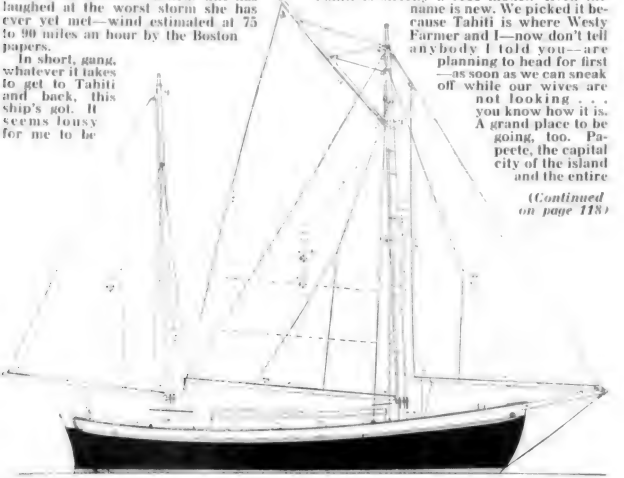
A photo taken at evening as Tahiti shoves her snout into the Indian River, Florida. This is the life! Your ship is your home, power is free—your food is the only cost.

to stick her nose under them. She is easy in her motions; she is remarkably easy to handle, and obedient to her helm; the rig, known as the ketch rig, is extraordinarily well balanced, not only under full sail, which all boats are, but under any combination of sails, which few boats are; and she has that much-desired but seldom-attained merit of a good cruiser, the ability to sail herself and hold her course for hours with the tiller lashed. She has laughed at the worst storm she has ever yet met—wind estimated at 75 to 90 miles an hour by the Boston papers.

In short, gang, whatever it takes to get to Tahiti and back, this ship's got. It seems lousy for me to be praising my own design this way, but building an ocean cruiser is a serious matter; it takes real work and money, and voyaging to foreign ports is a much more risky matter than playing around the home port. Any man considering such a voyage wants to be very sure the design he picks is right, because design is fundamental; if it isn't right, the best material and workmanship are simply thrown away. The editors have been holding back many months on these requests for plans of a real seagoing ship, realizing it is a serious responsibility to recommend one for such purposes. They felt it was better to tell you what a boat *has* done, than what you *hope* it may do, provided all calculations are right, and the designer knows his stuff. That's why I have told you all the whys and wherefores of the design, the plain facts in the case. You have a right to know them.

But, while the hull lines and sail plan, the fundamentals on which good performance depends, are strictly as originally designed, because no user has been able to suggest any substantial betterment, in all other respects the plans are a new job. All the voluminous notes on the boat I have accumulated over six years, all the good ideas of users for little betterments and added conveniences here and there, have been studied, and the best incorporated, so *Tahiti* is strictly a 1933 model. Even the name is new. We picked it because Tahiti is where Westy Farmer and I—now don't tell anybody I told you—are planning to head for first—as soon as we can sneak off while our wives are not looking . . . you know how it is. A grand place to be going, too. Papeete, the capital city of the island and the entire

(Continued on page 118)



Jack has designed two rigs for Tahiti. One is smaller than this for real ocean work in the Trade Winds. This rig is for coastwise cruising, totaling 470 sq. ft. The ketch rig will balance under all conditions of sail.

SPARKS from the RADIO EDITOR

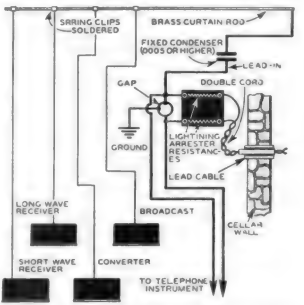
Edited by L. B. ROBBINS

Multiple Antenna System Made From Telephone Wires

CONFRONTED with the laborious job of providing four different antennae for his four different types of receiving sets the writer took steps to work out a single antenna system for the whole works. The results more than came up to expectations. It worked so well that I feel urged to pass it along to MODERN MECHANIX AND INVENTIONS radio fans.

The telephone service entered the building through the basement wall through a lead cable as shown in the accompanying sketch. On the basement wall was mounted the lightning arrester. This consisted of a slate block on which were two resistors connected at one end to the entering double wire. At the other end were attached the wires leading to the phone and across these ends was a vacuum gap. A third element between the gap pieces was grounded. Now comes the simplicity of the antenna stunt.

From one of the gap ends of a resistor a lead-in wire was run up through the floor to the room where the receivers were located. A fixed condenser of .0005 capacity was inserted in the lead-in in series. From this condenser a short piece of wire was used to connect to one end of a piece of brass rod about 4 ft. long. Four spring clips were soldered to the rod at equal intervals and the lead-ins to the four receivers clipped in.



Four receivers are hooked to the brass rod by means of clips at regular intervals. Other sides of receivers are grounded.

With this outfit all four receivers can be operated at the same time on different frequencies. Long, short, and medium waves can be received simultaneously without one receiver affecting the reception of the other.

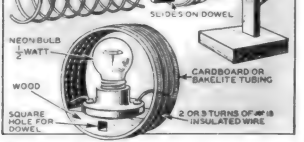
Handiest Method for Neutralizing a Transmitter With a Neon Glow Bulb

THE usual procedure for neutralizing a low power transmitter is to hold a flashlight bulb or small neon bulb near the tank coil and make adjustments until the neutralization is correct. This is fine so far as it goes but a much more convenient unit built for this purpose is shown in the accompanying illustration.

Cut out a section of bakelite or heavy cardboard tubing about three inches in diameter. Make the section about 1½ inches wide. Fit a small segment of wood to the inside as indicated and to its surface fasten an electric bulb socket into which can be screwed a small size neon bulb of about ½ watt.

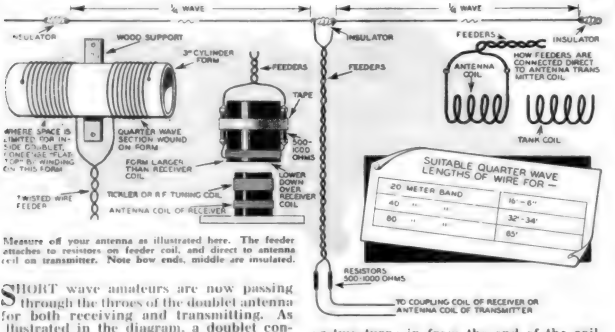
Then cut a squared hole through the wood below the socket as shown. Run three turns of No. 18 insulated wire around the tubing, cementing it down with Duco cement and spacing the turns about two diameters. Drill holes for the leads in the bakelite and attach the ends of the turns to the socket terminals.

The standard is fitted with a square dowel projecting horizontally to center with the transmitter tank coil. The coil can then be slid on the dowel and adjusted to any desired distance from the end of the tank coil. By regulating this distance any desired glow can be obtained in the bulb.



When neutralizing transmitter, slide the coil along the wooden rod till the correct point of adjustment is reached.

Making a Doublet Antenna for Receiving, Transmitting



Measure off your antenna as illustrated here. The feeder attaches to resistors on feeder coil, and direct to antenna coil on transmitter. Note how ends, middle are insulated.

SHORT wave amateurs are now passing through the throes of the doublet antenna for both receiving and transmitting. As illustrated in the diagram, a doublet consists of a "half wave" flat top cut in the exact center and fed by two feeders. The proportions of the flat top are always the same but the feeder lengths can vary by odd quarter wavelengths.

For example, we will take the doublet for operating in the center of the 20 meter amateur band. Using any good antenna wire, cut two pieces 16 ft. 6 in. long. These are quarter wave long for that frequency of 14200 kilocycles. Connect them together by an insulator and, of course, put an insulator at each end. This constitutes the flat top.

Then, to suit the distance from the antenna to the set, make the feeders of twisted lamp cord either one, three, five or more quarter wavelengths long. In this case it will mean either 16 ft. 6 in., 49 ft. 6 in., etc., long.

Connect the two wires at one end of the cord to the inside ends of the flat top as shown, soldering the joints, and connect the other two ends to the set as shown in detail. Lengths for other waves are shown in the table.

Coupling to a receiver can be best done as shown in the sketch. This consists of a coupling coil of about half a dozen turns of No. 20 to No. 24 DCC wire wound on a form that will just slip down over the antenna tuning coil of the receiver so this coil lies from an eighth to a quarter of an inch away from the antenna coil itself.

Strap two 500 or 1000 ohm resistors outside the form and connect the leads of the coupling coil to one end of the resistors and the feeder ends to the other ends of the resistors. That is all; the receiver tuning is done as usual.

To couple to a transmitter it is only necessary to attach the feeder ends to the ends of the antenna coupling coil. Some amateurs make a practice of tapping each feeder one or two turns in from the end of the coil, claiming it clears up the note. As the feeders are a quarter wave long no feeder tuning is needed as with a Zepplin type antenna.

Now for the listener with small quarters. If you haven't room to spread out a doublet you can make it very compact by winding the flat top portion on a 3-inch form as shown in the drawing. Just mount the cylinder on a suitable stick. Then wind each portion of the flat top (in the same direction) on the form about two inches apart and connect on the feeders. This works very nicely where room is at a premium and is intended for indoor use.

The doublet appears to be a very efficient antenna system and its simplicity makes it worth while building. Its chief claim is the low noise level to signal ratio. Where a certain frequency is desired the flat top and feeders can be cut to suit by following the table above. A half wave equals 468000 divided by the frequency in kilocycles. The result is in feet. Halve this for your quarter length measurements.

Insulate Wire in Awkward Places

WHEN you encounter the task of insulating a piece of bus bar at an inconvenient place in your radio set, first slit the piece of spaghetti tubing, then slip it over the wire, and shellac as shown in the accompanying drawing.

To insulate wire, slit spaghetti tubing, slip over wire, and shellac. This forms an insulated conductor well down in receiver's innards.

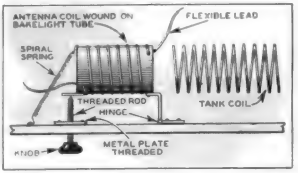
A Positive Variable Coupler for Your S. W. Transmitter

COUPLING the antenna coil of a low power transmitter is usually obtained by sliding the coil along to or from the tank coil on some sort of slider. Where room is precious this variable coupling can be more efficiently performed by changing the angle of the coil rather than its distance. A simple, positive arrangement is shown in the accompanying illustration for doing this from the panel.

Wind the coupling coil on a suitable piece of bakelite tubing. On the inside end of the tubing bolt a brass angle and attach this to a brass hinge fastened to the back of panel.

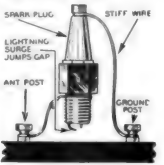
At the opposite end of the tubing fasten a flat piece of stiff brass and directly across from this drill a hole for a spiral spring fastening which attaches to the panel as shown.

The adjustment consists of a threaded rod running through the panel and a threaded plate as shown. The end of the rod bears against the aforementioned brass plate. As the knob on the panel end of the rod is turned one way the spring pulls the coupling coil down towards the panel and thus changes the angle of coupling. Turning the rod in reverses the motion and brings the coil in line with the tank coil.

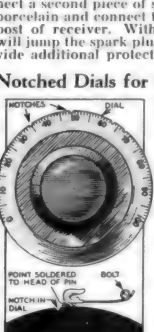


Spark Plug Protects Receiver From Lightning

HERE'S a way to use an auto spark plug as a lightning arrester. Wrap a piece of stiff wire around the threaded barrel of the plug to make a *tight* connection and then bend the wire so it can be connected to the antenna post of the receiver and hold the plug clear of all obstructions. Then connect a second piece of stiff wire to the post of the plug on the porcelain and connect this second piece of wire to the ground post of receiver. With this arrangement the excess charge will jump the spark plug gap from antenna to ground and provide additional protection.



Notched Dials for Scheduled Sigs.



THERE are many times when the operator wishes he knew at just what setting of the dial he had received certain stations. This is a simple matter to keep fixed by making very fine notches in the dial edge and having them come in contact with a fixed point on the panel.

Make your notations on the dial at the exact point where the station comes in loudest. When these points have all been determined remove the dial and cut very small notches in the dial edge as shown.

Replace the dial and then mount a safety catch on the panel as shown. A bit of brass should be soldered to the under side of the pin and filed to a knife edge. This will spring down into the notch when the spring tension of the pin is sufficient.

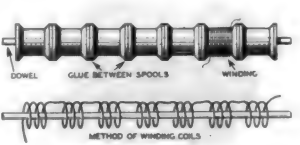
File notches in the dial to locate immediately the station you want.

Wind R. F. Chokes on Silk Spools

R. F. CHOKES made by winding the wire on one form are inefficient because of high capacity. To distribute the capacity wind the coil in sections as shown in the sketch below.

Get a number of small wooden silk spools, as many as are needed, and also a length of wooden dowel. Smear the dowel with glue and force on the spools as illustrated. Drill a small hole through the two end spool flanges for the wire to pass through and then put on the windings.

Having estimated the number of turns your particular choke calls for, divide this number by the number of spools you have in the form and wind on just so many turns to a spool. This distributes the total capacity and thus raises the efficiency of the choke.



Comical MOUSE Circus

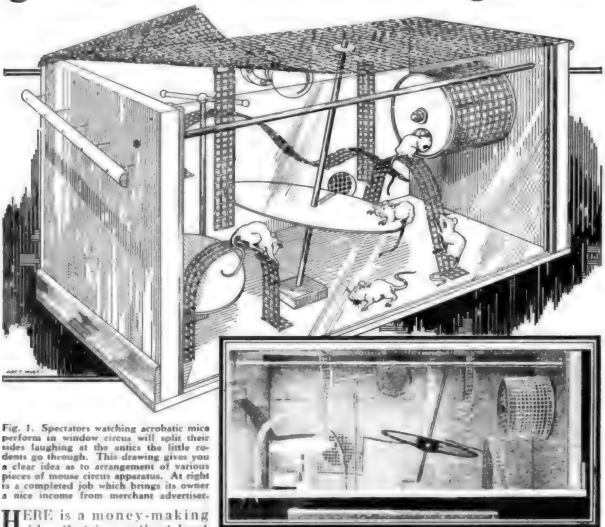


Fig. 1. Spectators watching acrobatic mice perform in window circus will split their sides laughing at the antics the little rodents go through. This drawing gives you a clear idea as to arrangement of various pieces of mouse circus apparatus. At right is a completed job which brings its owner a nice income from merchant advertisers.

HERE is a money-making idea that is worth at least five hundred dollars of any man's money. It is a veritable gold mine for any man who has even the tiniest spark of mechanical ingenuity—and it has been thoroughly tested and proven as a cash-getter.

It's a mouse circus, using trained mice which aren't trained!

Its usefulness is in creating a window attraction for stores in all lines of business. Two days' trial on merit will convince any of 'em.

Its cost is slightly over two dollars per circus, and each circus rents for a minimum of three dollars per week to merchants. Upkeep is practically nil.

With a dozen or more circuses established in down-town stores, they will afford anyone a regular pre-depression, boom-time salary. And the best part of the whole thing is that they advertise themselves—create new demands!

Lack of space does not permit us to tell here of the insane, side-splitting performances these rodents put on—but a glimpse of the crowds that flock around windows where they are would tell you plenty.

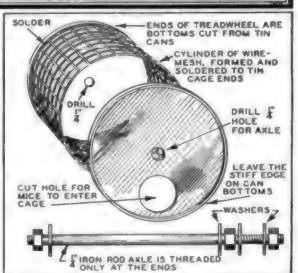
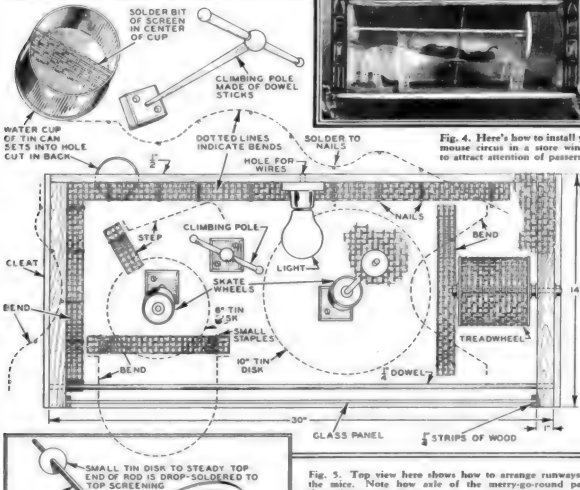


Fig. 2. The treadwheel, made from ends of old coffee can and screen, rotates around the ¼ in. iron rod axle, which is bolted to the side of the box. Mice entering the hole in the end run 'round and around in an endless circle, and make monkeys of themselves trying to balance on the screen when on the outside. Keep the axle well greased to give the wheel plenty of flexibility.

Brings in a Steady INCOME

Troupe of little mice cavorting about in this freak circus displayed in merchant's windows will attract huge crowds of passers-by—and net one a neat profit.

Fig. 4. Here's how to install your mouse circus in a store window to attract attention of passers-by.



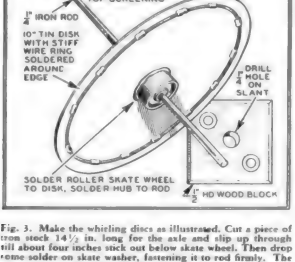


Fig. 3. Make the whirling discs as illustrated. Cut a piece of iron stock 14½ in. long for the axle and slip up through till about four inches stick out below skate wheel. Then drop some solder on skate washer, fastening it to rod firmly. The short end goes into middle block, long end penetrating up through screen over top. Disc should have decided slant.

Fig. 5. Top view here shows how to arrange runways for the mice. Note how axle of the merry-go-round passes through screen on top.

And this is no sales talk, it is pure, unadulterated facts, and has been successfully tried in St. Louis by an ex-automobile mechanic, who found himself without employment and hit upon the idea.

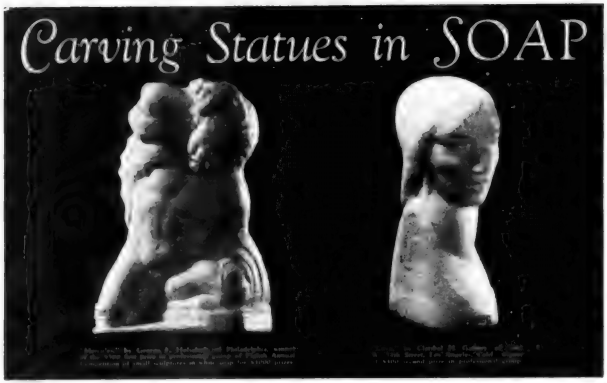
The circus itself is simple in construction, as shown in accompanying drawings.

First, a box, 30" long by 14" square, is built, leaving the top and front open. Down the front edges, on either end, ⅞" strips are tacked, leaving ⅞" between to take the window glass front.

Exactly in the center of the right-hand end, drill a ¾" hole. In the back, near one corner, make another hole about 2" in diameter. Directly in the corner, (both these latter holes should be near the floor) cut a square hole about 2½"x1½". Near the top, also on the back, and near the

(Continued on page 124)

Carving Statues in SOAP



Artistic possibilities of soap carving hobby are seen in these remarkable pieces, winners over 4000 other entries in contests.

SCULPTURING in soap is a new hobby that can be great fun and great art as well. It possesses a thrilling fascination for amateurs and experts with artistic leanings.

There's nothing very hard about it. The tools are very simple and inexpensive. If your skill should fail you for a moment and you make a false slip on a cake of soap, it will still possess a household usefulness. So the waste in soap-carving is negligible.

A skilled artist can work wonders in soap. Some of these artistic products rival the masterpieces of the ancient Greeks in beauty of line and form. Statues worked out of soap have been exhibited in recent years in some of the country's greatest art galleries and museums, particularly the famous Anderson Galleries in New York City.

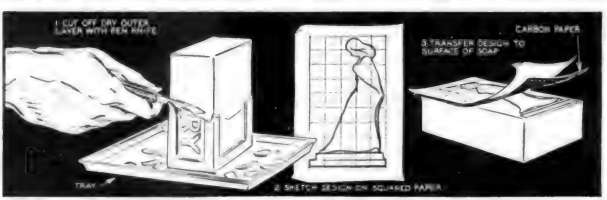
Although the color of the soap used in this very modern art does not make much difference, the pure white variety is preferred by artists and experimenters. It carves easily and is readily available.

A single cake or a large mass may be used for sculpture, and bas-relief or high-relief may illustrate the work. After the art object is completed it may be colored with ordinary watercolor paints or may be left the original gleaming white of the soap which looks so much like marble.

As for the soap artist's implements: A paring knife or a pen knife and one or two orange wood sticks are all that is necessary. The knife should have a thin pointed blade of medium size. The sticks are such as are used in the care of the finger nails.

The first step in carving is to prepare the cake of soap. This is done by cutting off the outer surfaces on all sides with the knife, removing the lettering and the raised edges. As little as possible should be taken off on the narrow sides. See Fig. 1 below.

The second step is to apply the design. This is done by first sketching on paper the subject chosen (Fig. 2). The paper should



First three steps in carving statue from soap. Removing outer layer of soap leaves all of bar with same slightly moist consistency, ideal for carving. Side view photo of subject makes an excellent pattern to trace on soap as the initial step.

is Fascinating New Hobby

Two more striking carvings. After New York showing sculptures go on tour of principal art galleries throughout country.

be the same size as the cake of soap and the design should be placed so that it will be in the center on the soap—when the paper is placed over it.

The design is transferred to the soap by placing a piece of carbon paper, the same size as the cake, on the soap, as illustrated in Fig. 3, and then tracing over it lightly so that the carbon will not smear. If it does smear, a thin layer may be scraped off and the tracing repeated.

The third step is cutting the outline, which is done by removing the greater part of the soap which will not be used in the model. The cutting is started at the upper right hand corner, leaving a quarter of an inch outside of the traced design. The cake should be cut clear through, from top to bottom, so that the excess soap is removed all the way around, as in Fig. 4.

Now the preliminary work is finished, and the real carving of the model begins. First, all the more important lines are outlined. Each high point is taken in turn and outlined roughly. The high points, of course, are those nearest the surface of the soap. The low points are those farther in.

After completing the rough construction, as instructed in Fig. 5, carving is continued from the highest points to the next highest and so on until all the planes and forms have been cut away from the highest to the lowest planes. When all of them have been cut away and have been shaped, it is time to start finishing the details.

It is important, however, that this step is not started until the model has been gone over carefully to insure that the planes and forms are correct.

Any sharp edges must be cut away, the rough surfaces smoothed, and the details of the parts which give expression to the subject defined. The model should be turned often so that the various parts are completed gradually. There must not be an attempt

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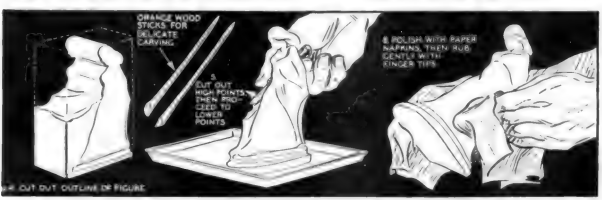
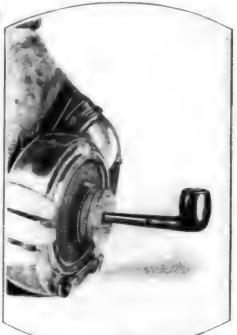


Final steps in turning out carving. When outline has been cut out real carving begins. Mark out, roughly, the more important lines, then chisel out these, proceeding to next highest points. Make sure that all planes and forms are correct.

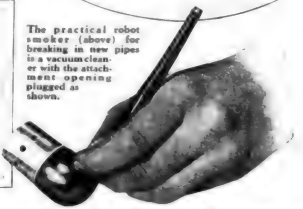
Pipe KINKS Keep SMOKES Satisfying

Prevent cracking bowl of a cherished but brittle old pipe by arranging a piece of cork in ash tray as shown above. When emptying, the dry and fragile bowl is tapped on the cork.

The cool-smoking, long stem pipe shown above was made with an ordinary pipe and a piece of glass tubing. The glass tube is placed between the bowl and the stem and held firmly in place with adhesive tape. Below right—The bowl and stem of a pipe inserted in a sponge thoroughly drains, when not in use, for next smoke.



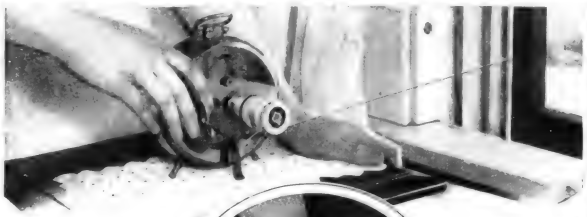
A broken bowl stem repaired with copper wire is shown in the photograph above. The wire is wound as tightly as possible around the broken section and then soldered in place. Let the solder flow around the entire winding to form a tight metal tube over the broken part. Old pipes which are nearing their end can be made like new with this simple stunt.



The practical robot smoker (above) for breaking in new pipes is a vacuum cleaner with the attachment opening plugged as shown.

Smoking a pipe in a high wind is almost impossible, but this simple shield solves the problem. Shape tin to fit snugly around the bowl and punch holes in the shield to supply air. The shield prevents the wind from blowing burning tobacco out of the bowl and into smoker's face.

Robot Clock Does Handy Household Tasks



With the cord hooked to a small dowel supporting the window, the unwinding of the alarm key will jerk loose the support and close the window, saving a painful trip across the room on cold winter mornings. Remove the sash weights from windows.

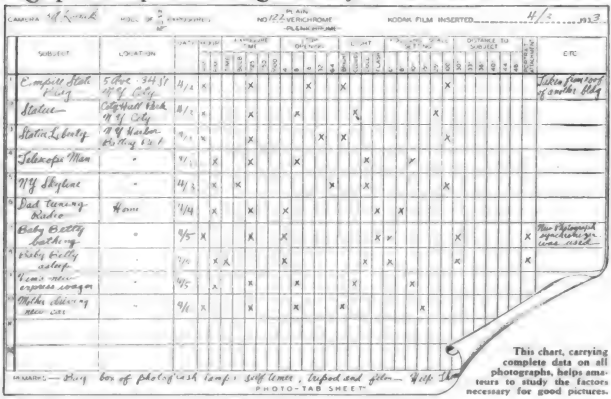
To make this electric robot, remove handle from top and screw in chain socket. The end of the chain is then connected to spool with small staple. Percolator, heater, etc., can thus be turned on automatically.

Clock is operated on to make robot by removing alarm key and winding on spool with a threaded metal core.

Clock turns off gas water heater at predetermined time when string wound around spool is attached to the lever on the valve handle.

Any radio receiver provided with a toggle switch can very easily be turned on or off with an alarm clock in the manner shown here. For morning reception, the radio set is simply tuned to the regular morning broadcast program before the family retires. At night, set clock for hour you want radio to start. The piece of string on spool does the trick.

Keep Snapshot Record for Better Photos



This chart, carrying complete data on all photographs, helps amateurs to study the factors necessary for good pictures.

Builds a Log Cabin for $2

ALL records for architectural economy were recently broken by an enterprising and ingenious youngster in Kildair, S. Dak. His accomplishment was the construction of a roadside hot dog and pop stand at a total cost of two dollars. How did he do it? Simply by corralling all the loose railroad logs lying around and utilizing them as siding for his log cabin, shown below.

The cracks between logs were chinked with mortar to give the log cabin effect. Inside sandwiches are served, outside, gasoline, so customers are accommodated coming and going.

Believe it or not, but this attractive log cabin was built for a total cost of $2. Economy was effected by utilizing old discarded railroad ties as logs.

TAB sheets to keep records of all factors involved in making photographs are a great aid to learning to take good pictures under all conditions.

A chart is made for each film. These charts can be made to fit a pocket notebook so that they are always handy when a photograph is taken. By comparing records and results the amateur soon will gather all necessary information for taking good pictures.

By jotting down the subject of each photograph when taken, the chart will reveal which pictures failed. A study of the data, compared to good pictures taken under similar conditions, usually will show the reason for the failures. The sample chart above shows the data required and the simple method of keeping the record. A tab sheet somewhat similar can be used to record darkroom work and results.

Tool For Decorative Glass Edges

A PRACTICAL tool for producing decorative scalloped edges on glass or mirrors is shown in the drawing below. It is made from a piece of steel cut out as shown and drilled for an old drill rod. A set screw fitted at right angles to the drill will hold it firmly in place. Gently but firmly force downward until glass chips off.

Wide Overshot Wheel Does Prairie Sawing

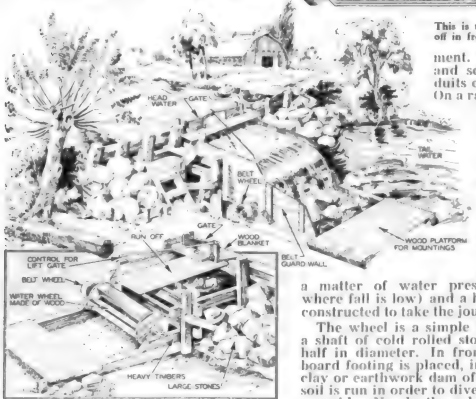
Plenty of power in an overshot wheel of the type shown in photo above for sawing out cordwood, grinding feed or for whirling around an adequate generator.

EVER popular among all readers who have rural homes near flowing water is the subject of waterwheels. Several designs have been published in past issues of this magazine, both overshot and undershot types, as well as turbines.

Now comes Leo D. Harris, of Killdeer, S. D., who shows by drawing and photo how he solved the problem of sawing cottonwood out on the Dakota Prairie. The installation of his plant will be of interest to other hydroplant fans.

First we must take into consideration the peculiarly convenient form of soil they have on the prairie. It has so much clay in it that a simple dam of clay, or a ditch, will promptly absorb water to a depth of about an inch, and the wet soil is then virtually a cement. Thus simple rock and soil dams and conduits can easily be made. On a rapid prairie stream the water was impounded with simple piles, rock rip rap and a board gate. A blanket was constructed as wide as could possibly be made to accommodate the stream (power on a water wheel is as much a product of area acted upon as it is a matter of water pressure—particularly where fall is low) and a bed of timbers was constructed to take the journals of the wheel.

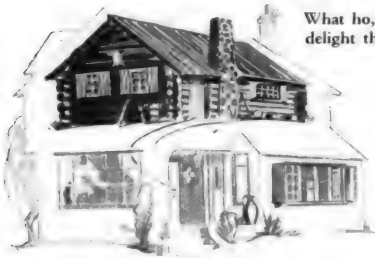
This is the way water is dammed off in front of the power take-off.



Drawing shows how the Harris dam, gate, blanket and overshot wheel are put into creek to get proper headwater.

The wheel is a simple 12-blader hung on a shaft of cold rolled stock an inch and a half in diameter. In front of the wheel, a board footing is placed, in front of which a clay or earthwork dam of this South Dakota soil is run in order to divert the tail water to one side. Nearly three horsepower can be taken off this wheel, which runs a circular saw very nicely.

Attic LOG CABIN Makes



What ho, gang! Here's a club room to delight the heart of any M-M fan who likes to swap mechanical gossip with fellow boat, plane, or radio builders. With a few dollars and an unoccupied top floor you've got a veritable log cabin hangout right upstairs.

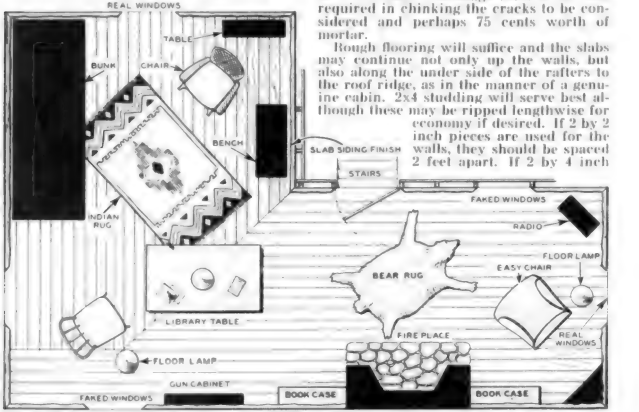
AN ATTIC hangout after the manner of Andy the Greasemonk is afforded in this top-flight idea—rainy afternoons, snug evenings before the fire, in a place in which to dream of future how-to-build conquests is yours with this he-man's hurrah's nest.

Bill and Joe and the rest of your neighborhood hangar gang will make it a headquarters; the old folks will welcome it because it will take such activities as ground flying off the front porch and put 'em up in the waste space of what is now the attic of your house. And it won't cost much—the log slabs specified are only about five bucks a thousand feet. You can measure your space, and multiply into it these following ideas, and shortly arrive at an estimate of what the whole thing will come to.

Because of the nature of the finish, no particular care need be exercised, particularly if the cracks are to be chinked. However, if you have access to a small shop planer, the slightly uneven edges can be made straight and the slabs laid side by side with no noticeable cracks.

The chinking method will save time and be more realistic although there is the time required in chinking the cracks to be considered and perhaps 75 cents worth of mortar.

Rough flooring will suffice and the slabs may continue not only up the walls, but also along the under side of the rafters to the roof ridge, as in the manner of a genuine cabin. 2x4 studding will serve best although these may be ripped lengthwise for economy if desired. If 2 by 2 inch pieces are used for the walls, they should be spaced 2 feet apart. If 2 by 4 inch



Here is suggested a layout for your attic hangout. Dimensions of your attic will vary, of course, but this scheme gives you a good idea as to how snug and attractive you can make your top-floor space. Make changes to suit your own ideas.

a Hangar CLUB ROOM

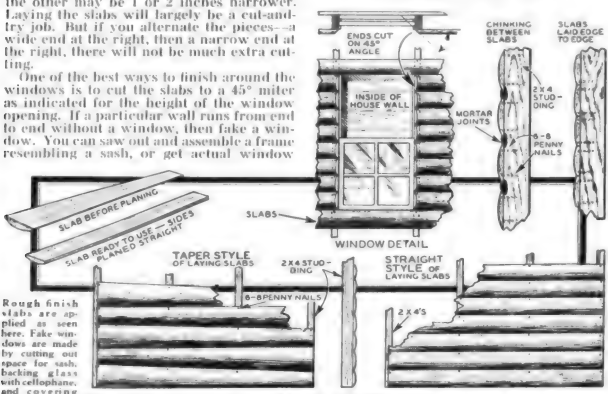
Here's what your attic will look like when you've converted it into an indoor log cabin. An ideal hangout for the hangar gang, the radio club, or the Izaak Walton League on winter nights or rainy afternoons. A fireplace is much to be desired.

pieces are used, you may space them as far as 4 feet apart without lack of proper strength.

The slabs which you will get will usually vary in width from end to end. One end, for instance, may be 6 inches wide while the other may be 1 or 2 inches narrower. Laying the slabs will largely be a cut-and-try job. But if you alternate the pieces—a wide end at the right, then a narrow end at the right, there will not be much extra cutting.

One of the best ways to finish around the windows is to cut the slabs to a 45° miter as indicated for the height of the window opening. If a particular wall runs from end to end without a window, then fake a window. You can saw out and assemble a frame resembling a sash, or get actual window sash and back them with colored cellophane. When such openings are fitted with these frames and curtains properly hung, the effect will be surprisingly realistic, particularly at night.

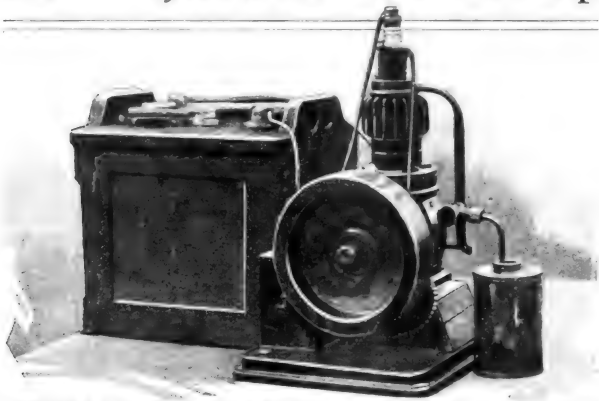
(Continued on page 123)



Rough finish slabs are applied as seen here. Fake windows are made by cutting out space for sash, backing glass with cellophane, and covering with colorful curtains. Chink slabs with mortar to add realism to the effect of room.

Simple GAS Engine Can Be

Made from Old Tire Pump



A good idea of the size of this midget engine can be had by comparing it with the spark plug and the storage battery. The ignition system is bigger than the engine! Note the ambroid can used for a gas tank.

by **ORRIN HOOPMAN**

MOST everyone mechanically inclined at some time or other feels the urge to build something new and something different in the experimental line.

Here's a suggestion to those who are in that mood these stormy fall days.

Go to your nearest junk dealer and purchase one of the small Stewart tire pumps used on a number of older model cars. Junk dealers' shelves are full of them.

Be careful to pick one with fairly tight main bearings or it will be necessary to renew them. This may look like a very small affair to ever be an engine, but if it is built correctly it will run for hours at a time and have fair power. I'm showing pictures of the one I built, to prove it.

Fitting on the Spark Plug

First we saw off the projections on top of the head and turn it smooth to have a square surface to work on. The hole which originally had the check valve in is bored to ½ in.

This is for the spark plug. Now mark position of valves and bore guides starting with a small bit and increasing it to 3/16 in.

Be sure these holes are bored perfectly straight through head. Next enlarge them to ½ in. from the inside ¾ in. deep. This will leave ¾ in. for the guide.

Now drill 5/16 in. exhaust port ¼ in. deep, boring from the side in toward the valve guide. Drill with ¼ in. bit from inside of head until you hit this hole. This will give your valve an inlet. Bore intake port the same using a 9/32 in. bit instead of 5/16 in. and tapping for intake pipe.

You will notice in boring for valves that you have run into a chamber in the head. This must be brazed full.

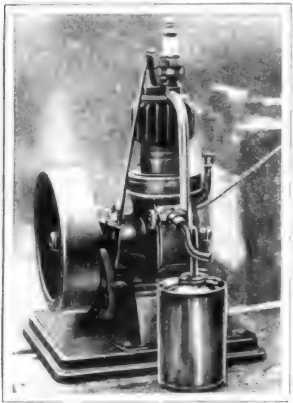
Valves Machined From 5/16" Bolts

Now turn the threads off a spark plug base and insert in hole bored for same. Braze it in, as there is not room for threading.

The valves may be machined from 5/16 in. bolts or any other suitable material. An extra long guide should be used on exhaust valve to hold it in line when being forced open with rocker. This can be screwed to the head. Grind the valves in until you get a smooth even seat. The valve springs may be held on by a washer and pin or by riveting washers. A very light spring should be used on intake valve.

The rocker support is built from a piece of 5/16 in. bolt with the lower end turned down to 3/16 in. to make a shoulder to hold it when it is screwed in. Build the rocker as shown and be sure adjustment screw hits exhaust valve square before boring center hole.

Fill holes in the cylinder by inserting rusty 3/16 in. rod from inside 1/16 in. This



This shows the disposition of the valve timing gear and the lift rod, as well as showing the placement of the ultra-simple induction type intake carburetor.

will keep the brass from running inside cylinder wall.

To lower compression for internal combustion work, a lead washer ⅜ in. thick must be placed between the cylinder and the crankcase. This also acts as a gasket to make the base oil tight.

Build the base next and mount the engine, using a paper gasket between the base and engine. This will give you an oil tight crankcase.

By putting a check valve on the breather to keep a vacuum in crankcase you will have no trouble in keeping your engine free of oil leaks.

The next job is to find a pair of small gears with a 2 to 1 ratio, the larger gear should not be over 3 in. in diameter. You will probably be able to find a pair of these on an old 4-cylinder magneto. The smaller gear is fitted on crankshaft and soldered in place. A cam must be built on the larger gear to work the exhaust valve. This can be filed from a piece of brass and then soldered to the hub.

A 5/16 in. shaft is used for the cam gear. This should be bent to a right angle and one end welded to the base to hold the gears in mesh.

Building the Flywheel

Screw on the head next and fit a push rod the correct length in place. When you have this working free you can time the exhaust valve.

Building a good flywheel will be a great help in making your engine a success.

The hub of the wheel should be quite shiny before casting so that the lead will flow around it. The form is built to use as little lead as possible and yet have enough extra lead to machine wheel true when done. The complete wheel should weigh about 7 pounds.

Build the governor as shown and mount the ball on the flywheel before keying it to the shaft.

Adjust for Correct Timing

It is necessary to have the ball timed so that it holds the catch up while the valve is opening and closing. The correct speed is obtained by adjusting tension of the spring on the ball.

An insulated brass contact is bolted to the base so that it will connect with the timer each round of the cam gear.

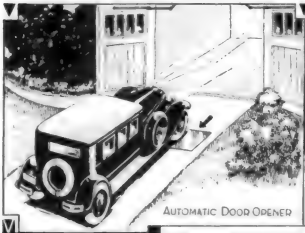
Adjust the timing by shortening or lengthening the contact. Drawing shows relative positions of cam and timer to give nearly correct timing. A vibrator coil is used for ignition.

(Continued on page 121)

Right: The head of the pump is drilled for the intake ports, and the plug is brazed in. Valves shown are made from large screws.

Component parts for the conversion are shown at left, above, in order named: Flywheel, gasketed cylinder, half time gear bracket, cylinder head, valve lifter, base and carburetor. At the extreme right is seen the base with half time gear.

Fortunes Waiting for INVENTORS



Editor's note: Questions of readers desiring advice on how to secure patents, on methods of procedure, or on ideas for inventions, will be answered when such requests are accompanied by a stamped, self-addressed envelope. Never send models as they cannot be accepted. Address inquiries to Patent Editor, Modern Mechanix and Inventions, 529 South Seventh Street, Minneapolis, Minn.

PRESIDENT Roosevelt's National Recovery Act has increased the demand for new inventions a hundred-fold. There appears to be a mad rush to launch into new and profitable lines as quickly as possible and it is the opinion of the writer that inventors have not been offered an opportunity of this kind during the whole history of our very successful Patent Office.

Anti-glare Rear View Mirror

Where is the lucky man who can so manufacture or arrange an automobile mirror that the driver will not be affected by the approach of bright lights from the rear? Some anti-glare mirrors have been placed on the market but they have not been successful. Perhaps if a mirror cannot be developed some sort of a little device can be devised to temporarily change the plane of the mirror.

Generator for Bike Light

Some electrical fan ought to design a tiny 1½-volt electrical generator so small that it can be fitted into the front hub of a bicycle and so thoroughly protected that it will not be rendered useless by heavy rains. It should also have an automatic cut-out so that higher voltages will not be developed when the bicycle is at high speed. It is estimated that such a thing would be worth at least $50,000 to its inventor.

Machine to Tell Height, Weight

If an inventor could devise some sort of an automatic device to measure the height of people while they are being

(Continued on page 142)

A SIMPLE Supercharger for Your CAR

by ROGER FORBISH

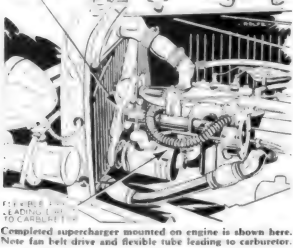
Pike's Peak will be just a mole hill with this supercharger on your car.

Increase the power of your motor twenty per cent with the device described here. Eight horsepower can be added to a Model "A" Ford engine with this supercharger.

THIS supercharger will mean a great increase in the power of your automobile motor. It can be built in the ordinary home workshop at a cost of approximately two dollars.

The design is simple enough to permit changes to suit materials on hand. Briefly the supercharger consists of an impeller fan driven by the fan belt of the motor at a speed of 12,000 revolutions per minute. The fan is fitted into a housing to which is attached a flexible pipe which carries the forced air direct to the carburetor. The supercharger described here is intended for a carburetor intake up to 1¼ inches. It can be easily changed for a larger intake.

No attempt has been made to give dimensions of the length of the bearing and shaft housing (Fig. 9) because it depends on the method of mounting the supercharger. The bearings and shaft are lubricated with light motor oil through a sump idea incorporated in the housing itself and also by means of two oil lines leading from an oil container placed above the supercharger. This container may be a tin can with a tightly fitting lid and with the oil lines soldered to the bottom. Work on the housing should be done with the idea in mind that the finished job must be oil tight. For the housing itself, get a piece of ¾" iron pipe. Its inside diameter will have to be increased to slightly under 11/16" by drilling. Do this work carefully, as the bearings are pressed into the housing and are held by no other means. Drill and tap a hole in the center of the length of the housing for an oil plug. This plug will allow for filling the housing with oil from time to time. Two ⅛" oil line fittings are placed in the housing. The holes for these are drilled ¾" from the ends of the housing.



Completed supercharger mounted on engine is shown here. Note fan belt drive and flexible tube leading to carburetor.

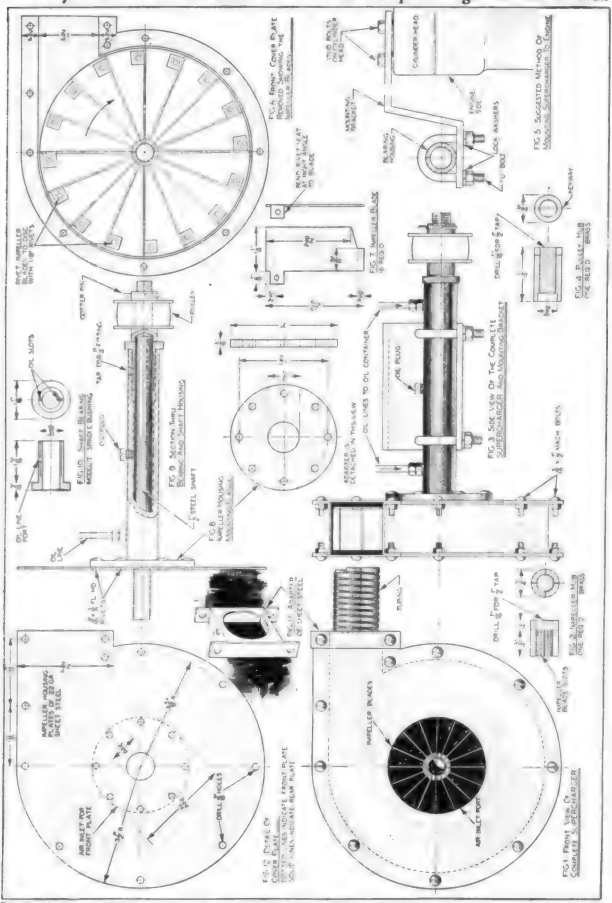
The two bearings used are made of Model T front spindle bushings. With a thin, flat file cut two oil grooves about 1/16" deep in the bearing surfaces. Don't cut these clear through, but stop short of the flanged end as shown in Fig. 10. Drill a ⅛" hole down through the upper oil groove ¾" from the inside of the flange to correspond to the oil line hole in the shaft housing. When the slots have been cut in both bearings press the bearings into the housing. Before forcing the bearings into place, put a thin layer of gasket cement on the inside of the bearing flange. This will squeeze into any defects and will make a good oil-tight job. The flange on the bearing at the fan end of the housing must be filed down even with the housing to allow the impeller housing mounting flange (Fig. 8) to be pressed over it.

The shaft, ½" steel rod, is threaded on both ends to take the impeller and the pulley hubs. The length of the shaft should be about 3½" longer than the bearing housing.

The impeller has sixteen straight blades mounted on a disk. The number of blades may be decreased but do not use less than eight. The blades are fastened to the disk by means of rivets as shown in Figs. 6 and 7.

If the fan pulley on your engine is driven by the camshaft, it will turn clockwise when viewed from the rear of the engine. If it is driven by the crankshaft, it will turn

(Continued on page 126)



Details of all parts of the supercharger are clearly shown here. Complete instructions are given in accompanying article.

Build this SCALE MODEL

by **Commodore Jack Waring, Jr.**
Model Yacht Racing Assn. of America.

Gar Wood himself let Jack Waring take off the lines of his famous champion, which is modeled here about 1/20 actual size.

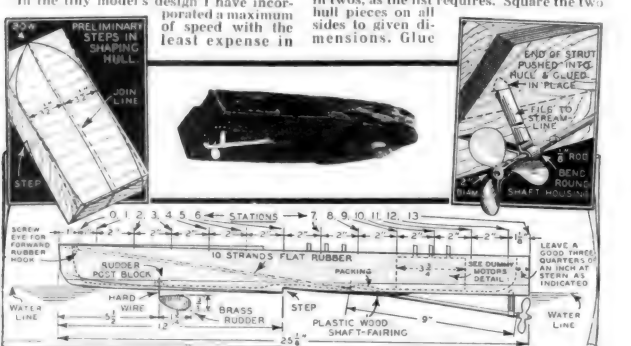
This 25.1 inch model is propelled by stout rubber bands after the manner of model airplanes. It planes quickly, has good duration.

A ROARING, leaping, fire-spitting, smoke-belching demon—that's what *Miss America Tenth* looks like in action at first sight! Half a million of us watched her defeat England's champion last year at Detroit, Mich., and saw her in action again this year—the same *Miss America X*, which, despite the above adjectives, is about the most beautiful motor yacht ever built.

The day before he set the present world's record of 124.86 miles per hour, Commodore Wood, the "Grey Fox of Detroit," told me he was confident of beating Kaye Don's 119 m.p.h. mark. This done, our model of his *Miss America X* can now boast the highest title possible for any boat.

In the tiny model's design I have incorporated a maximum of speed with the least expense in building. Some might prefer an *exact* scale model, completely finished with heavy metal fittings, tanks, and motors, for displaying. But it seems to me that a model of the fastest boat should actually go in the water, and snappily, too. This has been accomplished in the design, taken from dimensions and lines of the real *Miss America X*. Our miniature has a ratio of about one-twentieth the length, and one-twentieth the m.p.h. speed, of Commodore Wood's craft. As for cost, this 25.1-inch long boat may be built for around one hundred-thousandth the outlay of the original Tenth—or, about 82.50 (this figure may be cut a third by using white pine and a home-made propeller).

For the reason that balsa is difficult to get and quite expensive, in large sizes, certain parts of the model are to be ordered in twos, as the list requires. Square the two hull pieces on all sides to given dimensions. Glue



The hull of this model flyer is carved from balsa, which is glued along the center line to make a block large enough. The outside is shaped first, chiseling all reverse curves later, and filing them smooth. Lengths are given here, and sections in drawing at upper right. Article gives details on rudder and strut.

# of MISS AMERICA X

Inset shows the prototype, pictured at 124 miles an hour—the world's speed record. Perspective drawing shows how the hull is hollowed out on the sides. The motor is simple, yet strong enough to drive the boat at a scale speed of about five m.p.h. Lower right shows body plan laid on grid 7/16" by ½" spacing.

the 2.6" wide faces together with ambroid, overnight, with half a dozen small clamps. After the joint has dried, take a hacksaw and cut crosswise 12" from the bow, to a depth of one-quarter of an inch. This makes the step, which acts to lift the boat out of the water.

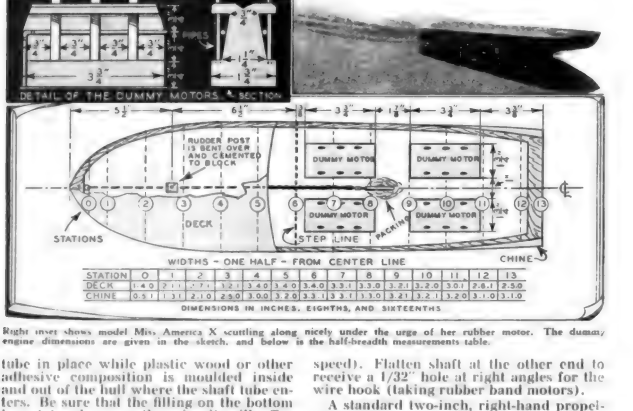
Shaping Up the Hull

Shape the outside of the hull first, before hollowing the inside. It is not necessary to make templates, but the body plan should be enlarged to full size from the drawing, so as to give an idea of the contour of each section. The best tools for shaping the hull properly are a small plane, a wide gouge (1½ or 2 inches), a 1¼-inch chisel, and a half-round file. Plane the sides fore and aft as well as on the bottom—starting from the step—towards bow and stern. When this has been done there will be curves in the hull, but none of the reverse (or inwards) kind. Reverse curves must be made with a gouge, then chiseled to smoothen, lastly leveling with a file. A look at the body plan indicates reverse curves only on the sides between stations 0. and 5.; on the bottom from 0. to 2.

After the outside is completed and sighted fairly on either side, gouge out the inside, leaving about ⅜" at the bow and the stern. Extreme care is necessary in this hollowing job, as the sides are to be about one-eighth of an inch thick (excepting at the chines, along the keel, and on the top edges or sheer—where it is one-quarter inch thick).

Be Careful With Balsa

In order to get the shaft tube through the hull on the centerline 18 inches from the bow, burn a ¼" hole at the correct angle. Special care must always be observed while working with large, fragile pieces of balsa . . . so bear lightly but firmly on your tools. Set the aluminum tube in exact alignment by sighting from its outward end at the stern towards the bow inside where the rubbers will be attached. Bend the strut so that it just encircles the tube, and place it in the hull Vee-shaped. Although fitted permanently, the strut will hold the



STATION	0	1	2	3	4	5	6	7	8	9	10	11	12	13
DECK	1.40	2.11	2.75	3.21	3.40	3.40	3.40	3.31	3.30	3.21	3.20	3.01	2.61	2.50
CHINE	0.51	1.31	2.10	2.50	3.00	3.20	3.21	3.21	3.30	3.21	3.20	3.01	3.00	3.10

DIMENSIONS IN INCHES, EIGHTHS, AND SIXTEENTHS

Right inset shows model Miss America X scuttling along nicely under the urge of her rubber motor. The dummy engine dimensions are given in the sketch, and below is the half-breadth measurements table.

tube in place while plastic wood or other adhesive composition is moulded inside and out of the hull where the shaft tube enters. Be sure that the filling on the bottom is not too lumpy, otherwise it will offer enough resistance to slow down the boat considerably.

Approximately 12 hours will dry the packed fillings; in the meantime, work on the decks. Plane each piece to the outline of the sheer on one side; then plane the flat surfaces as follows: Along the curved outward edges plane topsides about 3/32" thick, sloping gradually to a full three-eighths at the center where the two pieces are joined and glued together. This line along the center is the crown. It is advisable to hollow the inner sides of both deck pieces, too. There is but little strain on this part of the boat, and it, as well as everything else, must be as light as possible. The weight of both decks runs to a total of 1½ ounces.

Miss America Has Forward Rudder

A forward rudder in place of the usual one abaft the prop, may cause comment, but here it is Gar Wood's creation. Cut the spring brass to shape and attach a piece of thin gauge wire to its front end tightly. At a point 5½" abaft the bow, glue a scrap block of balsa about ½-inch square inside the boat. Drill through from the outside merely by pushing the wire straight upward, and bend horizontally as it breaks through.

If you do not have a metal lathe, take propeller and brass shaft to a machinist and have one end of the shaft sweated into the prop in precise alignment (be positive of this or the prop will be off center, making it useless for turning in water at high speed). Flatten shaft at the other end to receive a 1/32" hole at right angles for the wire hook (taking rubber band motors).

A standard two-inch, right-hand propeller may be purchased from any model supply house, or make one yourself from sheet brass two inches square and 1/16" thick.

I have left the dummy wood motors on the model for the last, because they really shouldn't be in the boat when it's racing—they serve only to give the model a realistic appearance. Competition between two or more of these models requires speed, and plenty of it . . . this cannot be had unless each racer is trimmed down, without unnecessary weights. To make in detail the four Packard engines and their total 6,400 horsepower would entail work that would be wasted on such light wood. For this reason the scale replicas of *Miss America's* big motors are in their approximate shape, and the 24 exhaust pipes (which actually emit smoke and flame on the real boat) which

(Continued on page 125)

Complete Bill of Materials

(a) 2 pieces balsa 25.1" x 3.5" x 2.6" (for hull).
(b) 2 pieces balsa 11" x 3.5" x ⅛" (forward deck).
(c) 4 pieces balsa 3.75" x 2.25" x 1.75" (motors—dummy).
(d) 4 pieces balsa 24" x .25" x .13" (exhaust pipes).
(e) 1 piece spring brass 1.8" x .8" x .015" (rudder).
(f) 1 piece aluminum tube 9" x .25" outs. diam. x .15" inside diam. (shaft tube).
(g) 1 piece brass rod 10" x .13" (shaft).
(h) 1 piece aluminum 3.5" x .04" x .5" (propeller strut).
(i) 1 brass cast propeller, 2" diameter.

This list of materials shows what is needed for building the authorized model of the world's champion speedboat, as taken off by Jack Waring, from Miss America X.

KINKS On Keeping Used Paint Brushes

Outdoor house paints are generally of the pigment-in-oil variety. Brushes used on these paints may be kept pliable in water.

THE advent of the colloidal paints such as Duco, Spray-on and Cellulose has confused many a home painter as to the proper treatment of the surface to be painted, the use of the paint, and the method of cleaning the brushes.

Colloidal Quick-drying Paints

As opposed to the old emulsion paints, colloidal paints are a form of gelatin which dry rapidly and are not soluble in any oils such as linseed, turpentine, etc. The surface to be painted must be scraped down to the bare wood or else must be of the same color as is to be painted. When cleaned, the surface may be coated with the paint either by brushing or spraying, which is a favorite way of handling the newer time saving paints. The brushes may be cleaned in gasoline or alcohol. Turpentine, water or oil will not cut such paints. Keep the brush in a can of kerosene when not in use. This will allow you to keep it from drying, allow you to clean the brush on newspaper and use it over again. The paint itself can be thinned with amylacetate, obtainable at any drugstore, or with banana oil.

Oil Paints

The paints known as emulsion paints are a different breed of fish. They generally consist of some readily oxidizable organic oil, generally linseed oil, in which is mixed a lead pigment, properly tinted with other metallic precipitates such as lead chromate for yellow paint, and so on. Such paints can be thinned with any organic oil, such as linseed oil itself, or with turpentine.

Brushes used for this class of paint can be cleaned with turpentine and should be kept immersed in water if for short periods of inactivity, or oil for longer periods.

Car paints and quick-drying interior paints are generally of lacquer variety. Brushes used should be kept in kerosene.

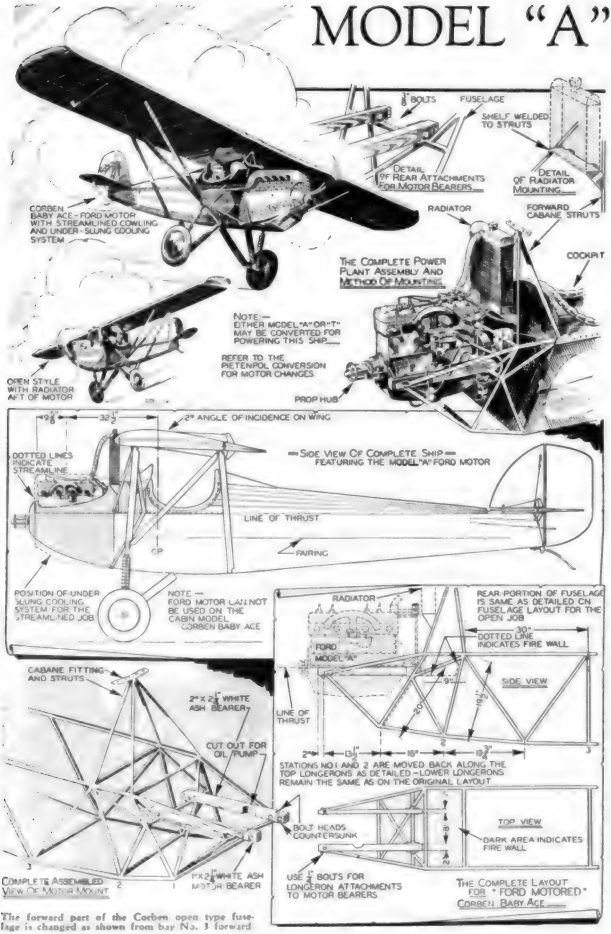
Shellacs

Shellacs and stains are solutions. A gummy substance from the body of a certain fly found in profusion in India is the base, and is called shellac. This base is dissolved in alcohol, which, because the paint is true solution, can be added as it dries and the body of the paint thus be kept in the required degree of thinness. Pattern makers who use a great deal of this kind of covering are in the habit of putting the stuff on wet the first coat, and touching a match to it to burn off the alcohol immediately. This will produce a flat finish, dry in a jiffy. Final coats are left with the alcohol unburnt so as to finely divide the particles of shellac and give a glossy coat.

Brushes used with shellac should see their whole life spent right in the paint pot, as the shellac or stain can be thinned with denatured alcohol at will. Never use the same brush for other colors—the stain will "bleed."

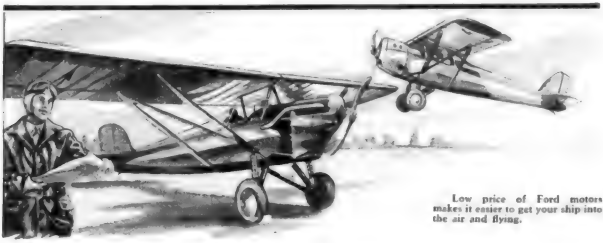
Only emulsion paints are impervious to oils, gasolines, etc. Colloidal paints will blush immediately they are spotted with alcohol, gasoline, etc. And shellacs will immediately become sticky in anything but water.

MODEL "A"



The forward part of the Corben open type fuselage is changed as shown from bay No. 3 forward

Motor for Corben Baby Ace



Low price of Ford motors makes it easier to get your ship into the air and flying.

Popular Corben lightplane can be powered with a Model A 40 h.p. Ford conversion, giving good performance at low cost.

LIGHTPLANE fans who have looked to MODERN MECHANIX AND INVENTIONS as the mentor in things lightplane-wise will be pleased to see this conversion article here. It shows how the ever-popular and highly reliable model A Ford, 40 h.p. at 2200 r.p.m. can be installed in the highly popular lightplane design, the open Corben Baby Ace.

Plans for the Corben ran in the 1933 FLYING MANUAL, which is still obtainable with complete instruction article on the ship. Fifty cents will bring it to those who failed to "catch" the plans in this publication.

Ship Extremely Popular

The Corben job was shown either as a cabin ship or as an open job. The cabin Corben cannot be adapted to the Ford, because it is impossible to balance the fuselage with the weights thrust as far forward as the motor installation requires.

The ship was designed for a Szekely motor. This motor weighs about 130 lbs. The Ford weighs about another hundred pounds. The climb will be lowered a bit, but there is no question but what Ford reliability and low price offset some loss in performance.

The Motor

The motor is converted as per the Pietenpol conversion plans which ran in the 1932 FLYING MANUAL, and for motor details the uninitiated are referred to that book.

There are no changes to be made to the Pietenpol-Ford conversion for use in the Corben Baby Ace.

The main changes are to the ship itself. From bay No. 3 forward a new trussing has to be welded in. The new dimensioned layout is shown in the lower right hand corner. A firewall of 20 gauge aluminum is clipped in along the shaded area. This is not only for fire protection, but it serves its greatest use as a shield to keep oil and gas from creeping in all over the cockpit.

In the welding, Stations No. 1 and 2 are moved back along the top longeron, the lower points for the bay struts remain the same on the lower longeron.

The engine bearers are of ash, 2"x2¼" with one side of the bearer heavier than the other one, so that there can be a cut around for the oil pump at the side of the base. The bearer on the thin side is 1"x2¼" ash.

The rear ends of these bearers are held in clips welded to the cross bay strut, and have ⅜" n.s. bolts through each engine bearer.

Two methods of mounting the cooling system are shown. One is a so-called streamline method wherein the radiator is faired into the lines of the ship, the other is the conventional cabane mounting for the radiator.

The writer's preference is based on experience, and holds out for having the radiator mounted up on the cabane.

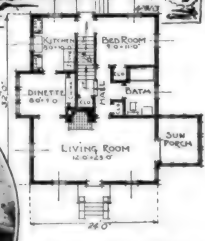
Contrary to expectations, the radiator cuts into visibility only slightly, as the honeycombs are in direct line, and you can see through the radiator very nicely, even for watching the horizon for landings.

It has been the experience of Mr. Pietenpol, designer of the famed Model A Air Camper, that a normal thermal cooling system, wherein the water ran around its cycle in normal fashion with the hot water rising to the top, and then cooling, was responsible for enough more r.p.m. to give the ship better performance in spite of the increased drag. And this drag must therefore be much slighter than would ordinarily be supposed, due to the fact that whereas most designers treat the radiator as a flat plate resistance, it is not, for the same reason you can see through it so easily. Try

(Continued on page 120)

Six Room SERVICE—Four Room COST

There are four rooms of cost and six rooms of service in this little colonial bungalow, No. 4-W-3. Construction is in frame, with a covering of wide siding painted white and a green shingle roof.



Above—First floor plan for house No. 4-W-3 shows extremely convenient arrangement of rooms. Note that dinette replaces dining room. Left—Sun porch is a feature which affords luxurious lounging space and extra bedroom space when guests come.

HOW TO GET BLUE-PRINTS AND PLAN BOOKS

A one-sheet blueprint of any house appearing in Modern Mechanix and Inventions magazine may be had for $1.00, postage prepaid. Two new plan books, "Homes for Newlyweds," containing 32 of the latest ideas for low cost homes, and "16 Selected Homes for Lean Purses" containing time, space and labor-saving bungalows, may be had for 15 cents each, or both books for 25 cents, postage prepaid. Address Home Building Editor, Modern Mechanix and Inventions, 529 So. Seventh Street, Minneapolis, Minn.

DO YOU remember an automobile advertising slogan which read: "a six in the price range of a four"? In other words two extra cylinders, more speed, service and all 'round satisfaction at no more cost than for a four-cylinder job. Everyone knows what's happened to four-cylinder cars.

The same thing is happening to houses, especially small houses. Designers have so perfected the matter of space saving, housekeeping efficiency and economy in the use of materials that today you can buy or build a small house providing six room service at four room cost. The saving often amounts to between $1,000 and $1,500.

The little house illustrated here, No. 4-W-3, is a splendid example of space-saving. House and lot came within a price range of $4,500 four years ago. The plan and style are so standard they offer more than ordinary insurance against depreciation. Style is Colonial. Construction is frame. Wide siding painted white, green blinds, a green shingle roof, a refined but simple entrance porch are exterior features.

A living room across the front of the house opens onto an enclosed sun porch. This porch can be used for sleeping purposes. A dinette replaces the usual dining room, but it's a good sized dinette. The kitchen is a "wife saver." Bathroom and bedroom complete the first floor equipment. Upstairs there's space for another bedroom and storage. Price range—$4,000.

Bob Fitzsimmons

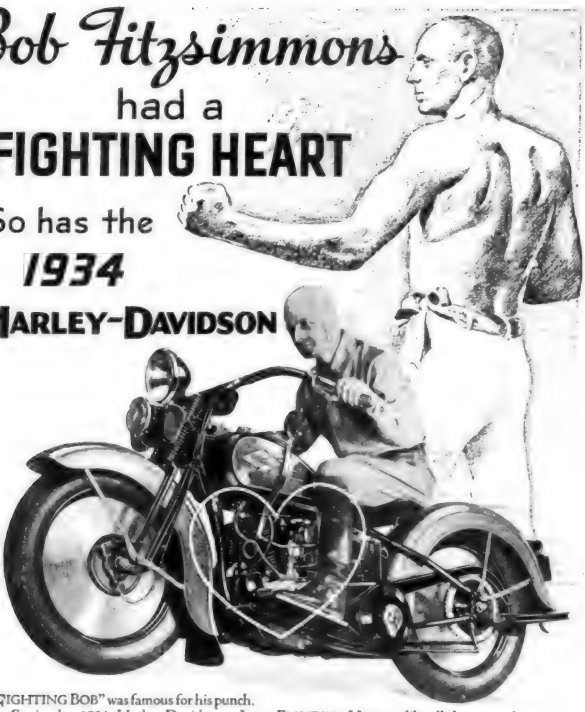
had a

FIGHTING HEART

So has the

1934

HARLEY-DAVIDSON



"FIGHTING BOB" was famous for his punch. So is the 1934 Harley-Davidson. Its new "TNT" motor delivers 36 horsepower!

Talk about speed and getaway! Wait till you feel the "punch" of this 74 Twin. Its power is so effortless that hills and miles just melt away as you twist the throttle.

Fitz never knew what quitting meant . . . Neither does this TNT motor, It's a true FIGHTING HEART, like all champions have.

Frame, comfort features, and sweeping Air-Flo lines all live up to the marvelous motor. What a motorcycle!

Ask your nearby Dealer about his Easy-Pay Plans. Send the Coupon for free literature.

MAIL THIS COUPON

Harley-Davidson Motor Co., Dept. MM, Milwaukee, Wis.
Interested in "Fighting Heart." Send illustrated literature.
Postage Stamp is enclosed to cover cost of mailing

Name_____

Address_____

My age is ( ) 16-19 years, ( ) 20-30 years, ( ) 31 years and up, ( ) under 16 years. Check your age group.

New Aid for Cachet Collector

AS AN aid to philatelists an international historical cachet committee has recently been organized with the idea of making accessible to historical students and stamp collectors commemorative cachets from major countries of Europe.

The object of the committee is to aid in directing the cachet business away from the money-making or racket angle into a self-supporting artistic and legitimate sideline to stamp collecting. It is planned later to organize into a society and to extend the cachet movement to the Far East and other sections of the globe.

Letter With an Interesting History

LETTERS cluttered up with stamps and postmarks quite frequently tell an interesting story to the keen eye of the philatelist.

For instance, the cover shown below. It started out in the United States and made its final voyage on a glider, finally arriving safely in Vienna, Austria.

Most interesting about the letter, however, is the fact that it was part of the cargo of the first Austrian glider to carry air mail. The glider, the Austria II, was flown by the famous pilot, Robert Kronfield. His craft, carrying 215 lbs. of mail coming from points throughout the entire world, soared for over 65 miles at 3000 feet altitude.

Celluloid Case Keeps Coins New

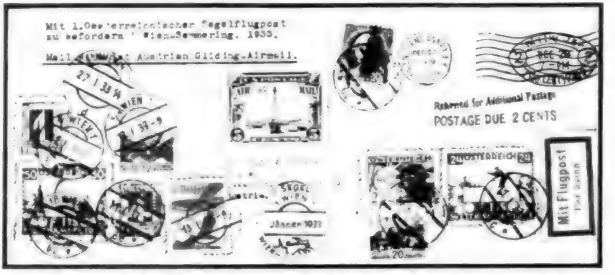
Celluloid top, sides and bottom of container are sealed together with acetone. Cut off bottom piece with shears.

SEALING coins in air-tight cases not only keeps coins shiny and attractive, but also adds to their value. Above is illustrated a small display case which any coin collector can utilize.

Some sheet celluloid and acetone are the materials needed, and here's how they are used. First cut out with a razor blade a strip of celluloid about 1/64 in. wider than the thickness of the coin and about ⅛ in. longer than the circumference. Then moisten both ends of the coin with acetone, wrap it around the edge of the coin so that one end overlaps, then seal tight.

Next moisten the edge of the strip with

(Continued on page 118)



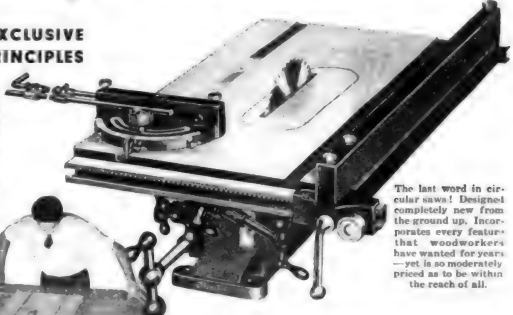
Interesting to philatelists is this cover, which had honor of riding with Robert Kronfeld, famous Austrian glider pilot.

New Design Circular Saw

. . *unusually Efficient and Convenient*

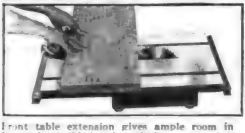
EMBODIES EXCLUSIVE PATENTED PRINCIPLES

The New 1934 "Delta" Circular Saw possesses many features of great value to woodworkers — features found exclusively in "Delta" Tools — thoroughly protected by U. S. patents. For full details see new 1934 "Delta" Catalog.

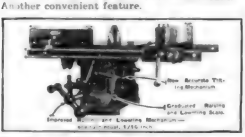


The last word in circular saws! Designed completely new from the ground up. Incorporates every feature that woodworkers have wanted for years — yet is so moderately priced as to be within the reach of all.

New patented extensions provide all the advantages of a table 4 feet square at a fraction of the cost of a very large table—a wonderfully convenient feature.



Front table extension gives ample room in front of saw blade where it is most needed. Another convenient feature.



A few more of the many convenient features found in the New 1934 "Delta" Circular Saw.

The New "DELTA" Circular Saw

can be secured mounted on a convenient, inexpensive stand — and in numerous combination units.

New Developments in "Delta" Motor-Driven Tools

New improvements and new features make the complete 1934 line of "DELTA" Motor-Driven Tools of unusual interest to all Woodworkers. The "Delta" line includes **Jointers, Circular Saws, Band Saws, Scroll Saws, Drill Presses, Woodturning Lathes, Boring, Routing, Sanding, and Mortising Attachments, and a complete line of accessories.**

FREE NEW 1934 CATALOG

Every man who works with wood—in factory or home workshop—will want to see this FREE 1934 "Delta" Catalog of Quality Woodworking Tools. It shows the full line of latest "Delta" Tools. It is packed with interesting illustrations and descriptions. It describes the latest developments in motor-driven equipment at the astonishingly low "Delta" price levels. Be sure you get YOUR copy. Mail the coupon — TODAY!

10-Day Trial

Easy Terms!

Because "DELTA" Tools are efficient and practical under actual working conditions, they are always available for a 10-Day Trial without the slightest risk. Satisfaction is guaranteed. For full details of this liberal offer and also of convenient Easy Payment Plans, send coupon TODAY!

DELTA MFG. CO.
3775 North Holton Street
Dept. M1133 Milwaukee, Wisconsin

DELTA MFG. CO., 3775 North Holton St.
Dept. M1133 Milwaukee, Wisconsin

Please plain me, without obligation, on mailing list to receive the Free 1934 "Delta" Catalog of Quality Woodworking Tools. Also send full details of your 10-Day Trial Offer and Easy Payment Plans.

Name ..... Age .....

Address .....

City ..... State .....

ADLETS FOR HOBBYISTS

STAMPS

STAMPS: 100 diff. 2c; 500 diff. 35c; 1,000 diff. 90c. Latham Stamps, D9, West Springfield, Massachusetts.

HANDY index to stamps ("The Stamp Finder"), illustrated booklet on Stamp Collecting, and stamp collector's catalog listing "Everything for the Stamp Collector"), sent for 10c to cover mailing expenses. Approvals included. H. E. Harris & Co., Dept. 49-A, 100 Massachusetts Ave., Boston, Mass.

FREE. Set of 5 unused Guadeloupe to approval applicants. Postage 3c. Royal Stamps, Lockport, N. Y.

100 DIFFERENT Stamps 20c, 50 African 20c, Lists Free. Michael, 942m 23rd Ave., Bellwood, Ill

FREE: Magnificent packet—Indies, Hyderabad, Rhodesia, Queensland, Silesia, Travancore, etc., to approval applicants enclosing 5c postage. Yakima Stamps, Yakima, Washington.

CAICOS ISLANDS—Also early United States, Uganda, Congo, Nicaragua, Monte Carlo, Niger Coast, Canada, Newfoundland, and Obangi—"Countries Collectors Haven't Got"—Free for 5c postage. Hurry for yours, Now. Empire Stamp Company, Dept. M.M., Toronto, Canada.

COINS

OLD MONEY Wanted. $5.00 to $2500.00 each paid for old coins. Buying catalogue 10c. Robert Cohen, Box 483, Muskogee, Okla.

COINS, California gold quarter size 27c; ½ size, 53c. 3c piece and coin catalogue, 10c. 500 different stamps and stamp catalogue, 10c. Norman Shultz, Salt Lake City, Utah.

WORTHWHILE Penny Approvals. Lowprice Sets. Elyria Stamp Company, Earlcourt, Elyria, Ohio.

HOBBY DEPARTMENT

Celluloid Case Keeps Coins New

(Continued from page 116)

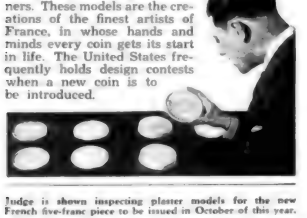
acetone and immediately lay on the top piece, which should be a little larger than the coin. After this, drop a little acetone around the edge where the coin case joins the bottom piece. Allow to dry about five minutes and then cut away the extra celluloid with shears.

Coins Begin in the Minds of Artists

WHERE we use five, ten, twenty-five and fifty cent pieces, many European nations, in monetary pieces of small denominations, use bills, most of which are much smaller in size than our dollar.

These bills are rapidly being supplanted in France, however, with metal coins, which prove far more durable and convenient. The five-franc note is now about to undergo coinage, and it is hoped by government authorities that the new piece will get into circulation about next October.

Designs for the new coin are now being submitted. The photo below shows one of the judges examining several models which are potential prize winners. These models are the creations of the finest artists of France, in whose hands and minds every coin gets its start in life. The United States frequently holds design contests when a new coin is to be introduced.



Judge is shown inspecting plaster models for the new French five-franc piece to be issued in October of this year.

How to Build Tahiti—Seagoing Ship

(Continued from page 88)

French-owned group, is called the Paris of the South Pacific, and those who have seen both, tell me it is quite an improvement on old Paree in many ways. But if you don't care for city ways, many of the near-by islands are just as primitive as they were hundreds of years ago. In fact, there are thousands and thousands of islands all over the Pacific, and I don't care what your taste in islands is, you can pick one to fit you absolutely.

Plenty of Islands to Lure You

Nor is there any reason to limit yourself to the Pacific. The Atlantic is short on islands, but the Azores, the Canaries and Cape Verde Islands are worth going far to see, so are the European coasts and the Mediterranean, and if you like tropical stuff, there are settlements all down the west coast of Africa. Coming back across the pond, there is South America, with everything from magnificent great cities like Buenos Aires and Rio to the jungles of the Amazon. And nearer home, right in our back yard, in fact, there is the Caribbean Sea, another grand spot for island collectors. Experienced travelers who have seen them all say that Jamaica, just south of Cuba, is the most beautiful island on the globe. All the world is in easy reach of the owner of *Tahiti*.

The National Geographic Society, Washington, has just put out a new map of the world, price 50 cents, that is one of the finest and clearest ever made in reasonable size. Besides all usual features, it includes special charts showing prevailing ocean currents and winds, good things to consider in planning a cruise. Get one of these maps and spend an evening over it, and if you haven't got a cruise laid out by bedtime, and aren't itching to go, I'll be a son of a sea cook. After all, life is pretty drab for most of us. When you are old, and plodding through the dull routine of business on Main Street, you'll feel the struggle has not been entirely futile if you can live over priceless memories of the days when you sailed the seven seas in your own little ship, or explored the sweet-scented forests of tropical islands, and really LIVED.

Now About the Kicker

Well, let's get down to a more detailed analysis of the job. The important question to most of you will be what power to use. I find most of those writing me about an ocean cruiser have the Diesel engine bug. Not that they know anything about it except that they are full of the advertising claims of economy and no fire risk. My advice is, forget it. Small Diesels have not been developed anywhere near the perfection of the large ones. They are far more trouble to operate, much more subject to stoppage, and usually slow on starting—and where you carry power for emergency use only, quick, sure starting is important. Moreover, their weight and bulk is excessive beyond all reason. Finally, as to economy, a 10 h.p. Diesel will cost about $1000 more than the same power in gasoline, and that will offset all difference in fuel cost for quite a number of years.

I have the dope on about 8 engines tried in these 5 boats, and have given an immense amount of study to the possibilities of all other available

types on the market, and my conclusion is that for myself I would select as the very best possible choice by long odds, a 10 h.p. 2 cylinder Miller kerosene motor. This is a real marine type, made in Chicago, and sold all over the world for more than 25 years. Believe me, any firm that stays in business that long has got to have the real goods. The engine has no more weight, bulk or cost than a gasoline engine—in fact it is a first class gasoline engine in every respect but a preheating kerosene manifold. It must be started on gasoline, but when warmed up the simple turn of a lever switches over to kerosene. And that is an ideal fuel for such a voyage, because, besides less fire risk than gas, no more than Diesel oil, it is far cheaper than gas, especially in foreign countries that impose a heavy tax on the lighter fuel; and moreover, it can be obtained anywhere in the world any supplies at all are obtainable—yes, in hundreds of little island villages that never even heard of gasoline, Diesel oil, or steam coal. They use it for lights, you see.

Miller Motor Speeds 8 m.p.h.

This engine will drive *Tahiti* at 8 miles per hour, which is her practical limit of speed with any power, since double-enders settle at the stern if forced too hard. It has the punch to buck a lot of wind and tide. It turns a reasonably large propeller, 18 inches, at the exceedingly moderate speed of 600 r.p.m. At that slow speed, and with its very oversize working parts, you can rely on it to run you clear around the world without need of repair or replacements. Moreover, it is extremely economical of fuel. A good operator can run it on 5 pints per hour, and even if you are not so good and waste six, still that would give you approximately 700 miles on the main 65-gallon fuel tank, and 125 miles more on the auxiliary tank, which is surely plenty. Don't try to increase the tankage a single gallon, for I will not guarantee good performance nor even safety in a following sea if you overload the stern.

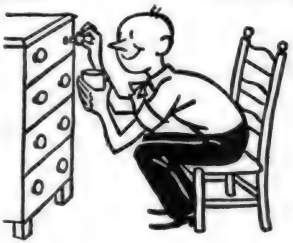
Use at Least 18-in. Props

Of course, you can use one of the popular light four-cylinder gasoline marine engines if you want to, but you absolutely must get it with a reduction gear, so as to handle a large propeller at low speed. Any propeller smaller than 18 inches will be incapable of pushing this hull against even a moderate wind, for the reason that the thick deadwood blankets most of its area. The Miller 10 h.p. has 212 cubic inches piston displacement. Real marine engines are rated in horses with a real kick, you see. An auto engine of such displacement would be called anything from 40 to 70 h.p. —good hosses for racing, but darned little pull for a heavy trucking job, which is what *Tahiti* is. That is my entire advice on the engine question, and it is no use writing to ask me if an old Ford or Chevrolet engine or some such junk would not do as well. You know it wouldn't. You can have lots of fun playing with old auto parts around the home port, where you are never in much danger, never far from help, and always near a garage full of replacements. But it would be suicidal to trust your life to scrap iron on the deep seas.

Oh, yes, one more pointer on power. Whatever

(Continued on page 120)

Home Repairs Easy to Make with New Canned Wood



Newly discovered wood that comes in cans makes it easy for anyone to keep home in first-class condition. Handles like putty, just as soft. Quickly hardens into wood, like natural wood. You can paint, carve it. Drive nails or screws into it. It's PLASTIC WOOD. If you have a broken chair . . . loose caster, ugly nick . . . crack in floor, hole in wood, plaster or tile, loose drawer pull . . . rotten spot in wood to replace . . . do a quick, expert, permanent job of repairing with PLASTIC WOOD. Results will surprise you. Paint, hardware stores sell for 25¢ a tube, 35¢ a can.

PLASTIC WOOD

HERE'S a steady, fine-paying business that earns big profits—you get two to three times your production cost. You get *cash every day.* Start right in your own home, in spare time, or have a shop of your own. Men and women in many parts of the country earning good steady incomes—making a product that everybody likes, that sells on sight—delicious, greaseless do-nuts baked by electricity with the Ringer Electric Do-Nut Baker.

"My Ringer Do-Nut outfit has ended my worries," says Arthur Rabenort, of Illinois. "I do a wholesale business only and am selling 80 dozen a day!"

Year 'Round Business

—Steady demand from stores, cafes, homes—and a fast seller at Fairs, Parks, Beaches, Highway Stands, Rinks, etc.

"The only business I know of that pays a profit the first day. I now have two Ringer machines," writes H. H. Liesenfelder, Wis. C. H. Barr of Ky. writes, "After searching the city for work, I bought a Ringer Do-Nut Machine. Now I supply steady customers that buy every week. It is a paying business." Mrs. T. A. Lay, Fla., writes, "Have all the business I care to handle. The machine makes a beautiful, tasty do-nut."

No Canvassing These delicious Do-Nuts speak for themselves. Grocers, restaurants, drug stores, lunch counters buy all you can make. Or, as others are doing, you can sell your entire output profitably by men, women or boys on commission basis. Ringer Do-Nut Baker operators who started in spare time at home now have attractive, profitable shops of their own.

Start Now! It takes only a $25 investment to start you. Get into the business that brings freedom from financial worries—that will make you independent, happy and prosperous. NOW is the time to start!

WRITE FOR FREE PLANS

—show you how easy it is to start making money at once. Send coupon or a penny post card for full information. No obligation. No salesman will call. Write today. Ringer Do-Nut Co., 195 Main St. N. E., Minneapolis, Minn.

Mail Coupon for FREE PLAN

RINGER DO-NUT COMPANY
195 Main St. N. E., Minneapolis, Minn.

Please send me Free Plans and full information about the Ringer Do-Nut Baker.

Name .....

Address .....

City ..... State .....

How to Build Tahiti—Seagoing Ship

(Continued from page 119)

engine you get MUST have magneto ignition for no kind of battery is likely to be much good after several months in tropical seas. For the same reason, electric starters are a waste of money. The old reliable Armstrong starter is the safest bet.

The next important consideration is the water supply. Long ocean passages in small boats can only be made by strict conservation of fresh water. Bathing and dish washing must be done in salt water, and that is also satisfactory for boiling potatoes and heating canned foods. An allowance of two quarts per man per day should be made for drinking and cooking. At that, the 60 gallon tank shown will supply two men for 60 days, which is longer than the longest ocean hop should require, even if you have to buck head winds a great deal, and supposing you get no chance to fill tanks with rain water. But, in fact, you cannot sail 60 days over any ocean without getting rain, usually a lot more than you want. In a pinch you can always distill water with your teakettle and a coil of copper tubing. However, if more than two men are to be taken, perhaps it would be well to double the water capacity by putting tanks under the main cabin berths. The weight will not matter there. Personally, I would prefer to keep that space for food supplies, although they can be packed away in odds and ends of space everywhere, with the canned goods largely under the floor. On long passages you must be content to live on simple foods of kinds that can be compactly stored, as all sailors do. On shorter runs there is no need to limit yourself. Still, overeating is a sure road to sickness on small boats, where one is confined to cramped quarters, with little possibility of exercise. It is wiser to do your heavy eating in port, sailor fashion. And drinking ditto, if you care for that in a large way.

BLUEPRINTS FOR "TAHITI"

Next installment of plans for "Tahiti" will appear in the December Modern Mechanix and Inventions, followed by third and last installment in January, 1934. You don't have to wait for these issues to get started with building her because complete blueprints are available now from M-M Blueprint Department, 529 So. 7th St., Minneapolis, Minn., for $9. Get full plans now and start work so your ship will be ready for launching in the spring. M-M blueprints are on durable paper, illustrating construction in every detail, made directly from Jack Hanna's originals. Prompt service; all orders sent postage prepaid.

Model A Motor for Corben Ace

(Continued from page 113)

taking a look through a honeycombed radiator and notice the difference. Pietenpol built several low radiator jobs, both faired and unfaired, and found that his ships performed much better with the high carbane type radiator. This is probably due to the better thermal arrangement just mentioned, and again is in part due to the fact that the radiator is closer to the ineffectual center of the slipstream, and therefore retards the ship less.

Carving Soap Statues Is New Hobby

(Continued from page 95)

to complete one single part, such as the head, before working on the others. The model must be carved as a whole.

The finishing touch is polishing, and is done when the model has been allowed to dry for a day or two after it has been completed. In polishing a soap sculpture, first rub it all over carefully with a paper napkin, and be particularly careful of projections which might break off. Then rub it gently with the finger tips and the palm of the hand. The finish thus produced is soft, yet reflective enough to bring out the highlights very effectively.

Soap Carving Is Authentic Art

Not many years ago, the idea of sculpture in soap would have been considered an ingenious trick, like the famous Michelangelo's feat of carving a lion in butter. But if you have ever seen an exhibition of small sculptures in white soap, you will realize that it is no trick. It is an authentic art that has come to stay.

The range of subjects has countless possibilities. Models of towns have been made in soap, scenes in ancient Egyptian and Grecian history, vehicles of transportation, puppet show models, studies in prehistoric life, famous characters and events in history, reproductions of the old masters—anything within the scope of human skill. Prize competitions are held frequently in this field of art and one soap manufacturer offers a first prize of $500, and second prize of $300 for the best productions in soap sculpture.

Gas Engine From Tire Pump

(Continued from page 104)

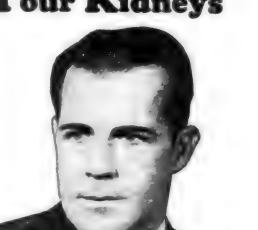
Build the intake "manifold" and mount on the engine. A fine needle valve such as used on gas stoves and lamps is soldered to the side of this tube and connected to the gas tank with a small pipe. A small check valve is used on end of pipe to keep the gas at needle valve at all times.

Hook on battery. One wire is grounded to engine, the other is run to one primary lead of the coil. From the other primary lead run wire to contact, and connect spark plug to secondary post. When the engine is turned slowly onto compression the coil should buzz just before piston reaches top. The exhaust valve should open ½ round later or just before piston reaches bottom, and should close as the piston reaches top.

It's advisable to screw the engine to a bench while starting as the speed may run 'way up until the right adjustment is obtained for the governor. This engine will vibrate at high speeds due to the fact that there is no counter balance on crankshaft, but is very satisfactory at moderate speeds.

Send for Free Copy of the Modern Mechanix Blueprint Booklet

Help Your Kidneys



WIN BACK YOUR PEP

Good Kidney Action Purifies Your Blood—Often Removes the Real Cause of Getting Up Nights, Neuralgia and Rheumatic Pains—Quiets Jumpy Nerves and Makes You Feel 10 Years Younger.

A famous scientist and Kidney Specialist recently said: "60 per cent of men and women past 35 and many far younger, suffer from poorly function ing Kidneys, and this is often the real cause of feeling tired, run-down, nervous, getting up nights, Rheumatic pains and other troubles."

If poor Kidney and Bladder functions cause you to suffer from any symptoms such as Loss of Vitality, Getting Up Nights, Backache, Leg Pains, Nervousness, Lumbago, Stiffness, Neuralgia or Rheumatic Pains, Dizziness, Dark Circles Under Eyes, Headaches, Frequent Colds, Burning, Smarting or Itching Acidity, you can't afford to waste a minute. You should start testing the Doctor's Prescription called Cystex (pronounced Sis-tex) at once.

Cystex is probably the most reliable and unfailingly successful prescription for poor Kidney and Bladder functions. It starts work in 15 minutes, but does not contain any dopes, narcotics or habit forming drugs. It is a gentle aid to the Kidneys in their work of cleaning out acids and poisonous waste matter, and soothes and tones raw, sore, irritated bladder and urinary membranes.

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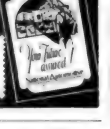

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Plan Your Midget Farm in the Fall

(Continued from page 73)

by following directions given in Fig. 10. Sandpaper the underside until smooth. By pressing down firmly in moist soil of good tilth, you can open a trench of uniform depth, ready to be covered to the desired depth. And remember to sow thickly and to thin when necessary.

Obviously, you are not always planting seeds. Take onion slips. In setting out onion plants, trim back both the roots and tops (Fig. 9). Set them in double rows, about 4" apart, using a sharp stick or dibble. Irrigate the furrows after the plants are set out, allowing the water to soak up well around the plants. The home gardener will find transplanting produces better dry onions.

Setting Out Tomatoes

When setting out tomatoes and similar plants, after preparing the soil lay off the rows with a string or marker. Then, by using a yardstick, measure off and designate the spot for each plant in the rows.

In the home garden, space tomatoes four and a half to six feet apart in rows six feet apart. Trellis plantings of tomatoes (Fig. 5) or cucumbers (Fig. 6) can be trained along a single plane where space must be conserved.

When the rows are lined out and the places to be occupied by the plants designated, transplanting may be started. The hand is the best tool, for the soil should be in such condition that the hand can work it easily.

First dig a hole about 6" in diameter (Fig. 7) to a depth which will, when filled, cover at least one-half the length of the plant. Place the roots around the bottom and press 1½" of soil firmly around them. Fill the depression with water. On following day fill it again. Then cover it with soil.

Tips on Transplanting

Here are some tips to remember in transplanting. For such tender plants as tomatoes, provide shade when they are first set out. A shingle or light board set on the south side at an angle will suffice.

It is better to wait until near evening to transplant, both because it is cooler and there is less danger of wilting. It is helpful to cut back some of the leaves and even the roots. This is especially good practice with beets, celery and lettuce. Carefully add a little commercial fertilizer in the soil around the plant.

Every gardener wants berries, especially strawberries. In heavier soils, plant strawberries on raised beds by drawing furrows three feet apart, center to center. Beds should be about eight inches high, depending on the soil's texture.

In very light soils, plant strawberries "on the flat." In smaller gardens, set the plants 12 inches apart, but be sure to "stagger" them so they will not be opposite each other. Water often.

I should like to mention one trick in planting an orchard, and particularly the individual tree. Many gardeners with small plots train fruit trees against the fence, but for larger fruit yield give it plenty of room. The tree reaches you from the nursery "bare root"; that is, without a ball of soil like that necessary with citrus trees.

The best season for planting generally is from January to April.

If you plan to plant more than one tree, lay

Plan Your Midget Farm in the Fall

cut the entire "orchard," placing a stake where each tree is to go. Secure accurate distances, so the group will present a uniform appearance.

In planting each tree dig a hole deep enough for the tree to stand at the same level as in the nursery, large enough so the roots can spread out along the bottom. (See Fig. 7.) Pile the top foot of soil on one side of the hole, the balance on the other. Place the tree in the hole, spread the roots naturally and fill in with **top** soil.

When the hole is three-fourths full, pour in 10 gallons of water so it will settle around the roots. Do not tamp the earth down! Do not fertilize the soil around the roots! Replace the rest of the soil.

Planting Board an Aid

If a planting board (Fig. 6) is used, set two additional stakes before the hole is dug, these to serve as markers. Take the planting board, place it so the original stake is in the center notch, then drive two other stakes, one in each of the end notches.

After the hole is dug, lay the planting board down to the stakes, then set the tree so that its trunk will fit into the center notch. This insures accuracy in lining up the rows.

Attic Log Cabin Makes Club Room

(Continued from page 101)

If the slabs are to be nailed in place rough and chinking used, space them as shown in plate 4 and later mix a rather thick mortar of 1 part lime to 3 parts of cement and 5 parts of screened gravel and trowel in place.

Some hair worked into the mass will prevent the overhang on the back side from breaking off. Since the slabs may shrink, the chinking should be put off for a few days. However, if the slab edges are jointed, then lay them tight and nail in place. When you arrive at a corner, miter the slab ends for greatest neatness. Any corner which protrudes into the room can be also assembled with a reverse miter.

Much will also depend upon the furnishings. Space available does not permit too many suggestions up this alley. You will find that Indian rugs for the floors and perhaps one as a drape for the wall, will do much in making the interior homelike.

The window curtains should not be gaudy nor expensive. Furniture may largely be that used last summer on the porch or in the garden. Or you can go two jumps farther and work out a special table, seats and benches from split logs, limbs and twigs.

Here, too, should go a special cabinet or case for your fly and surf rods, your guns and pistols, a curio rack and other trophies. You will find room too for special trophies on the walls. A day bed or pair of army cots can also be moved in and once in place will fit naturally into the picture.

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Mouse Circus Brings Steady Income

(Continued from page 93)

middle, drill another ¼" hole. Now—the two ends again. About 1½" from the point of the **open** corners, drill a ¼" hole in each.

While you're drilling, you may as well cut two 1½" square blocks of ½" material and drill ¼" holes in the centers—and this time, **lean** the drill slightly off the vertical, so that the holes **slant** a bit.

Into the two out corner holes you've made in the ends, fit a piece of ¼" doweling (about 14¾" long). This is used as a brace and also as a runway.

At about the center, in the bottom of the cage (floor), fit one of the blocks, the hole slanting to the **right**. Midway between this block and the left-hand end, attach the other—this time slanting the hole toward the **front**.

Hardware Man Your First Customer

Before we go any further, get a yard of ½" mesh screening; also, ask the hardware man for two roller skate wheels and a couple feet of ¼" iron stock (round). And talk nice, he may be your first "circus" customer. Then hunt up the soldering iron and a sheet of tin.

Find two large cans about 4" in diameter and make the tread wheel shown in Fig. 2.

Slip the screen cylinder on the axle, allowing enough freedom for the cylinder to whirl freely. If you wish, you may cut a 1½" hole in the can lid end of the tread wheel—the mice will then run inside it as well as out.

As for the whirling disks.

For the large one cut a circle of tin 10" in diameter, put a ¼" hole in the center, and follow the directions in Fig. 3 to assemble. Cut a piece of iron stock 14½" long, slip it through till about four inches stick out below the skate wheel. Drop some solder on the skate's washer, fastening it to the rod firmly.

Two Disks Needed

Make another disk in exactly the same way—only this time smaller, about 6" in diameter. And the rod in this case should be but four inches long, ending and not going through the tin, leaving the surface of this one clear and unobstructed.

Between the two disks (the small one goes into the other block, slanting out) you may construct a climbing pole—a piece of doweling 12" long, seated in a block like the disks, with a piece 4" long attached cross-wise near the top so that it resembles a miniature telegraph pole.

Into the oblong slot in the corner, insert a small can—half-in, half-out the back. This is the water trough and can be filled without opening the cage.

The two inch round hole alongside you now cover with a removable, square piece of screen on the outside (back). This serves as an exit. Whenever you wish to clean the cage, just place a **darkened** box over this hole and the mice will run into it. To get them back in, reverse.

Screw a stationary light socket over your ¼" hole in the back top center; run the wires through. This serves both as light and heat when the weather is cool.

Tack your top screening on.

Now, the runways:

Cut a few strips of screen, 1¼" wide. One, about 15 inches long, bend in a half-circle and

Mouse Circus Brings Steady Income

tack between the tread-wheel and the larger disk —allow it to reach just below the end of the cylinder's axle. It should run from the back of the cage, outward.

Cut some more and run them around the back and other end of the cage, about half-way between the top and bottom. Give them plenty of ups and downs—don't have them straight. Small finishing nails, aided by a few drops of solder, will hold the walk in place.

Making Runways

Another half-circle about 17" long, loop up and over the smaller disk—in a direction longwise to the cage, on the front side of the disk. Directly in front of this disk make a short step (5" high) with enough bent over for them to step on and jump from.

Hang a few short pieces of runway from the top of the cage attached to the screen there with wire so as to swing freely.

Slide your glass into its grooves—sprinkle some sawdust on the floor and it's finished.

Now about the mice. The St. Louis gentleman catches all his own in live-traps, claiming that the ordinary house or field variety of mouse is more suitable for such gymnastics. He puts his traps in convenient restaurants, bakeries, vacant lots, etc., even in his own cellar. He feeds them, daily, such things as ripe corn, wheat, raw potatoes, bread, cheese, bits of bacon, and an occasional corn cob. The cages he cleans once a week. About 12 to 16 mice to a cage give best results, he says.

However, if you do not wish to take the trouble of catching your own, authorities on the subject say that white mice, which you can purchase at any pet shop, give the same results. But remember to get mice—not rats!

Either way, you are certain of creating a sensation with your wild, hilarious mouse circus—and, incidentally, a bankroll!

Build Scale Model of Miss America X

(Continued from page 110)

we cut from balsa strips into 2-inch lengths. Streamline each pipe and glue six on a motor. Also glue a horizontal pipe along both sides of each engine.

Use No. 0, followed by No. 00 sandpaper in smoothing the outside (there is no need of sanding the inside). When the wood is sufficiently smooth, varnish a mahogany color on the inside, and the outside above the boot top. Paint a glossy black from boot top to cover all of bottom.

Actual motive power is furnished by inexpensive, powerful model airplane rubbers, the regular flat kind. For high speed use 3/16ths by 1/32nd of an inch in 12-foot lengths, in ten strands. To take the thrust on shaft tubing as well as to waterproof it, fit a small brass washer over shaft at the propeller. A small screw eye set deeply in the bow near the top will hold the rubber motors at the opposite end. If an "egg-beater winder" isn't handy, shape a hook from some heavy wire and place it in a hand drill, winding the rubbers thusly. For long-distance racing, naturally, you must employ rubber in shorter strands—10, 8, or 6-foot lengths.

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Simple Supercharger for Your Car

(Continued from page 106)

counter-clockwise. This supercharger is drawn for the camshaft pulley, but by reversing the bend of the blade tabs, and by reversing the impeller housing, it will be converted into the proper design for the crankshaft assembly. The blades are cut from 22 gauge sheet steel and are riveted to the disk (Fig. 6). The impeller disk, also of 22 gauge steel, is six inches in diameter. Drill a ¾" hole through the center. Drill the rivet holes in the disk, spacing them accurately.

Making the Impeller Hub

When this has been done, make the impeller hub (Fig. 2). The hub is made from a one inch piece of ¾" brass rod drilled and tapped as shown. Saw slots for the blades with a fairly thin hack saw to within ¼" from the end of the hub, as shown in Fig. 2. When the hub has been completed, proceed to assemble the impeller. First rivet the blades onto the disk. Then press the hub through the hole in the center of the disk, and line up the inner tabs of the blades with the slots in the hub. The tabs project into the center of the hub a little distance. Run the ½" tap through the hub again, cleaning out the projecting ends. This threading of the tabs will hold them in place securely when the shaft is run into the hub.

Impeller Housing

The impeller housing is made of sheet steel, 22 gauge. There is little clearance between the tips of the impeller blades and the inside wall of the housing (Fig. 6). This wall is a strip of sheet steel 2½" wide bent to the circular shape shown and its edges turned up ½" to form flanges for mounting the cover plates 1½" apart. If you have had experience in working sheet metal you can do this job yourself, but if you have not, a tinner can do it for you at a very reasonable cost. After having made the cover plates (Fig. 12), drill the holes in the flanges in alignment with the covers. Next make the adapter (Fig. 11) for the flexible metal tubing which carries the compressed air to the carburetor. It is made of sheet steel, cut, bent and drilled as shown. The holes are to be lined up with those in the housing. Solder the flexible tubing into place in the hole in the center of the adapter (Fig. 1).

The impeller housing mounting flange is made of 3/16" iron or brass cut and drilled as shown in Fig. 3. This flange is pressed onto the bearing housing and supports the weight of the impeller housing (Fig. 9). If you have brazing equipment or can have the job done cheaply, it would be best to have the flange brazed onto the bearing housing. Rivet the impeller housing rear cover plate onto the flange.

Supercharger Driven by Fan Belt

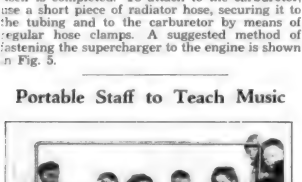
The pulley hub (Fig. 4) is made of ¾" brass rod drilled and tapped in the same manner as the impeller hub (Fig. 2). Drill out the threads for about ¼" in one end to allow for end-play adjustment of the shaft. The hub is slotted at the opposite end to receive a cotter pin for keying onto the shaft when the proper adjustment has been obtained. As the supercharger is driven by the fan belt, and should turn over at the rate of ten to twelve thousand revolutions a minute,

Simple Supercharger for Your Car

You will have to determine the size of pulley needed. It is either pressed onto the pulley hub, or held in place by set screws.

When all the parts have been made, proceed to assemble. Thread the shaft into the impeller hub as far as it will go. Use either a lock washer and nut or drill the shaft for a cotter pin to secure the impeller hub firmly to the shaft. Now insert the shaft in its bearings. Thread the pulley hub, with the pulley in place on it, onto the shaft and draw it up until but a very slight end play remains in the shaft. When the proper adjustment has been made, drill through the shaft for a cotter pin. This will secure the adjustment. Next assemble the housing. It is a good plan to make up two cardboard gaskets for the impeller housing to insure an air-tight fit between the cover plates and the flanged central portion. Then put on the flexible tubing adapter with the tubing attached. Attach the oil lines to the bearing housing, fill the housing with light motor oil by means of the oil plug, and the supercharger itself is completed. To attach to the carburetor, use a short piece of radiator hose, securing it to the tubing and to the carburetor by means of regular hose clamps. A suggested method of fastening the supercharger to the engine is shown in Fig. 5.

Portable Staff to Teach Music



Cleft signs, sharps, flats and notes are detachable in this portable music staff now in use at a California school.

THE object of the portable music staff, shown in the photo above, is to create more interest in the daily singing lesson for grade school children. The novel idea makes a game of this line of study.

A wire staff is strung between two small iron pipes at a height convenient to the children. Cleft signs, sharps, flats and notes are constructed out of black cardboard. As the teacher plays the piano, she pauses after each note to give the pupils time to figure out the correct wire on which to place the black figures.

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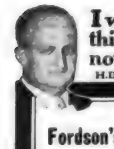

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GREEN LINE DRUG CO., Dept. 11-L, San Mateo, California

How Comic Cartoons Make Fortunes

(Continued from page 36)

gets a flat salary and 50 per cent of the gross receipts."

That supposedly potent factor called "pull" may get you a hearing with a publisher or a syndicate manager, George (Bringing Up Father) McManus told me, but it won't get you across with the public. You must produce something that attracts newspaper readers.

McManus Sweeps Art Department

McManus, who draws for King Features Syndicate, told me how he rang the gong:

"Older residents of St. Louis still remember me when I was a kid hanging around the Grand Opera House, drawing pictures and loafing instead of going to school. Some of the ideas for characters in 'Bringing Up Father' are drawn from stage people, chiefly comedians.

"One day my father got a note from teacher advising him to withdraw me from school. It was far from a complimentary request. My father called up a friend of his who was art editor of the old St. Louis 'Republic.' My father thought I had great talents as an artist, so I was immediately put to work sweeping and dusting the art department.

"That lasted for some time, and then the art editor saw some of my sketches of a woman with a lot of hair and assigned me to draw some fashion pictures for the Sunday supplement.

Birth of "Bringing Up Father"

"In 1903 I had some extra money. I quit and went to New York to be a comic artist. After six months of making the rounds of newspapers trying to get on the payroll, doing anything, I was down to the free-lunch counters. One last desperate trip to the editorial offices of The New York World—and I got a job there. Just luck, that's all.

"My first strip, called 'Ready Money Ladies,' was rotten. The idea was based on women arguing over the payment of carfare, sodas and such things. Next came 'Panhandle Pete,' 'Let George Do It' and then 'The Newlyweds,' based on the devotion of a young couple to their spoiled child.

"In searching about for a better idea I decided that in order to retain popularity it had to be human. The hen-pecked husband had been long established as a good laugh producer, and so I made such a husband the central character of my comic.

"It was my plan to give all of the characters save one 'mugs,' so Nora, despite the ugly maps of Jiggs and Maggie, was the beautiful daughter. Casting about for Jiggs' mug, I remembered a comedian at the Grand Opera House who had played the part of an Irishman. I decided he would fill the bill. I invented Maggie and I also originated Dinty Moore.

"Continuities" Latest Cartoon Strip

"Corned beef and cabbage and Maggie's rolling pin were the secondary characters in the strip. As much of the byplay was to be based upon Maggie's antics as a social climber and the unwillingness of Jiggs to put on the ritz, the rolling pin was handy for Maggie. Jiggs countered with his corned beef and cabbage teasers."

Thank You for Mentioning Modern Mechanix and Inventions for November When Writing to Advertisers

How Comic Cartoons Make Fortunes

"Bringing Up Father" and "Mutt and Jeff" are the old style comic strips which were intended to give the reader a laugh every day with no attempt to tell a story serially. In recent years there has developed a great number of cartoon strips which are not intended to be funny, but merely portray some part of a story from day to day. These "continuities" have been based upon the lives of historical characters, novels, or some plot conceived by the cartoonist and his "balloon" man.

"Buck Rogers" Draws Fan Mail

One of the newest, most popular strips of this type is "Buck Rogers, 2430 A. D," distributed by National Newspaper Service. The popularity of the strip is based upon the great interest in scientific developments, particularly in the aeronautical and military field. Lieut. Dick Calkins, a pursuit pilot during the war and a veteran newspaper cartoonist, draws the rocket ships, the degravity rods and belts, the paralysis guns, the moto-tubes, and other unusual equipment of the principal characters, Buck Rogers and Wilma. This amazing scientific material and the fantastic and perilous adventures of Buck Rogers and Wilma in their daily encounters with giants or tiny people of other planets are the products of the imagination of Phil Nowlan, a newspaper man who has accumulated a vast fund of scientific knowledge.

This vivid, dramatic and prophetic story of romance and adventure five centuries in the future has grown so popular in less than three years that it now appears in more than 200 newspapers. The fan mail of the author and the artist is enormous. Men, women and children send them requests for information on how to build the rocket ships, the degravity belts, and the unusual airships that carry their characters from planet to planet. Boys send in models of space ships and other machinery pictured in the strip, while many adults submit sketches of their ideas of the people and landscape of other planets.

How Comics Are "Manufactured"

Cartoonists draw their strips from two to three weeks in advance and their Sunday pages about eight weeks before the publication date.

All artists draw their Sunday pages of 12 panels, or scenes about 25 by 19 inches in size. The artists turn their pages into the syndicate office in black and white. Then in the engraving room two "silver prints" are made, which are nothing more than photos of the page. These silver prints are then colored by the artists.

"The original page and one silver print," explained Arthur Crawford, general manager of the Chicago Tribune Syndicate and Press Service, Inc., "is given to The Chicago Tribune. The original page is then photographed in the engraving room and from that negative four plates are made, called the key-plate, the red plate, blue plate and yellow plate. The key plate is black and white.

"The four plates are then turned over to the ben day men who color them. After the ben day has been placed on the four plates, they are etched and routed.

(Continued on page 130)

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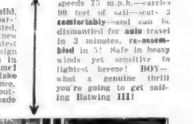

Photo shows BATWING III dismantled for travel.

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Address

Attach letter stating age, occupation, employer's name and address and that of at least one business man as a reference.

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4008 Addison St. Chicago, Ill.

How Comic Cartoons Make Fortunes

(Continued from page 129)

"From these four plates any color may be shown on the pages. The daily strips are always printed black and white. The originals are drawn so as to scale down to either five or six-column width."

Proofs of a week's supply of daily strips are sent by the syndicate to each newspaper buying the cartoon along with the mats from which plates are made in stereotyping plants. Each proof has a date, on which the strip is to be published, or a serial number so that that strip appears on the same day in all the client papers.

Fontaine Fox, who copyrights his own cartoons, draws the single picture type of comic. He got his idea for "Toonerville Topics" during a newspaper campaign against a dilapidated car line in Louisville, Ky. His cartoons are very popular.

The comic strip idea has grown so extensively that it has entered into the field of advertising during the past year. This has added greatly to the fortunes made by that small group of popular cartoonists whose drawings are read by millions of readers every day. This select group is not impenetrable. Newspaper editors, and indirectly the readers, are ready to pay even greater fortunes to the cartoonist who can think of better ideas or funnier strips.

Which Football System Will Win

(Continued from page 43)

Notre Dame's victories were usually featured by one or two long runs.

The Warner system is the most complicated of the three recognized offensives of football. Briefly, its principal strong point was deception. During his many years at Stanford University, Glenn S. ("Pop") Warner contended that the best way to advance a ball was to keep the enemy wondering where it was going to be. Through a maze of single and double wingbacks, reverses and criss-crosses, the veteran mentor came to be known as one of the greatest strategists of the game.

Warner Developed Interference Running

Warner was coaching at Carlisle when he first accepted the notion that since players were not needed to push the ball carrier through the opposition's defense, something else must be done with them. Thus he developed to a high degree what is now commonly known as interference.

Coach Dick Hanley at Northwestern is perhaps the most prominent champion of the Warner system. With some variations, the consequence of his own long experience, Hanley uses the system almost exclusively and very successfully.

In Figures 3 and 4 we find two of the most widely used Warner system plays. Fig. 4 illustrates graphically the wingback single reverse. It is simple in its design, but executed very rapidly and with utmost precision, it is most effective. Backfield man No. 1 receives the ball, starts to his right and having moved a short distance is met by backfield man No. 2, who then takes the ball and races around left end. Meanwhile the right guard and the remaining two backfield men are concentrating on the point

Thank You for Mentioning Modern Mechanix and Inventions for November When Writing to Advertiser

Which Football System Will Win

towards which the man with the ball is headed. They take out the opposing players, make a hole in the defensive line and run interference for the ball carrier.

"Pop" Set Fashion In Football

In Fig. 3 we are dealing with a play that can either be a consistent ground gainer or mean disaster to the team using it. Long hours of practice are required to culminate its perfection. It is known as the double wingback, double reverse. Here the danger of a fumble somewhere in the execution of the play is twofold. Only highly skilled backfield men can be depended upon to bring it to a successful conclusion.

As in the wingback single reverse, the play begins with No. 1 backfield man receiving the ball, moving to his right and passing it to No. 2 backfield man, but this time, instead of taking out the opposition's tackle, No. 3 man circles to the rear and accepts the ball from No. 2 so that again the ball is traveling in the direction to which it was apparently originally intended. There are many variations of this play, but its basic principles remain the same. "Doc" Spears, now at Wisconsin, has used both these plays. Ohio State has used them and Iowa has found them convenient ground gainers from time to time. Thus we see that Warner, who has been coaching football longer than any mentor in the country, except A. A. Stagg, has set the fashion in modern football.

Primarily, the difference between the Rockne and Warner system is that in the former the purpose is to achieve the objective with the most possible speed and in the latter the purpose is to reach the objective with the most power ahead of the ball carrier as is possible.

Minnesota Shift Harnessed Man Power

In the early days at Minnesota, as at most other large schools, the popular conception of good football was described best by one word—power. While other teams were literally shoving their ball carriers through the opposition with no thought of anything except to overpower the enemy, Dr. Harry L. Williams was busy devising a system whereby he could harness this power to some tangible scheme of intelligent play. Dr. Williams did very well in this respect and at length devised the system now known as the Minnesota Shift. Long before many other schools had heard of the shift, Dr. Williams was using it to good advantage.

Fig. 2 is an excellent example of the Minnesota shift. Lined up, the guards are behind the line of scrimmage. When the shift is completed the two guards have moved to the right of the center, the quarterback directly behind the right guard and one halfback behind the quarterback. In this position the strength is concentrated on the right side of the line. It would take a stone wall to stop this type of offense.

"Fool Them" Secret of Victories

Later, when he was coach at Minnesota, Dr. Spears, asked if he depended upon brute strength, replied:

"The popular notion is that our Minnesota

(Continued on page 143)

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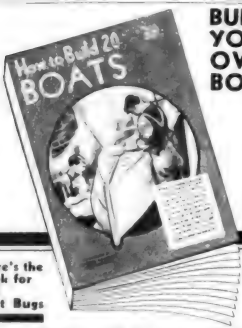

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Scotty—The Desert Mystery Builder

(Continued from page 49)

exclaimed. "They're the biggest set ever made twenty-five of them."

Music came to our ears. Scotty listened a moment.

"That's the pipe organ," he said. "It plays by machinery like a player piano. It's a Welte-Mignon, the same kind some of the kings of Europe have. It set me back sixty-five thousand dollars."

Some writers have claimed that Scotty uses this organ to drown the noise of machinery operating in his mine, which they say is directly below it.

Palace Has Three Insulating Roofs

A remark about the coolness of the palace brought out the fact that the house has three roofs lined with insulating material to keep out the blistering heat of the desert.

"What about those truckloads of railroad ties they were hauling in here as we came up?" I asked. "Are you going to run in a railroad?"

"H———, no!" Scotty exclaimed. "There's too many tourists come in here now." He explained that he had bought 240,000 of the ties from the Goldfield to Las Vegas Railroad, which had been torn up. Since rumor had it that the ties were being used to shore up his mine, I was prompted to ask another question.

"What do you need with railroad ties?"

"Wood. You have to have wood wherever you camp. We use a lot of it here. But with those ties we'll have enough to last a hundred years. They'll cover several acres of ground when we get them piled up. They have all been hauled from thirty to fifty-six miles."

Largest Batteries Supply Electricity

We strolled around to the place where an outdoor swimming pool was being built. This, too, according to some reports, was a mask for Scotty's gold digging operations.

"It's two hundred and fifty feet long by eighty-five feet wide and it's thirteen feet deep," Scotty explained. "And there's going to be a tunnel along one side with a glass wall so you can walk along and see the divers under the water.

"There's plenty of water. There's a two-hundred-foot head from the fenced-in springs a mile above the castle that gives us ninety pounds pressure here to run the hydro-electric plant. We've got the biggest batteries that the Edison company makes. They cost fifteen thousand dollars. And if we don't want to use the water power we can use the fifty-horse-power Diesel engines."

Machine Gun Loopholes Guard Entrance

He showed his garages, his stables, his mule

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Scotty—The Desert Mystery Builder

barns, his gasoline tanks, the desert Indians that he employs for outdoor work, but which some say work in that never-found mine, and the giant trucks and heavy wagons which are supposed to haul away the ore, but no one has ever seen them doing so. Finally he led us to a one-room miner's shack in a fenced-in area above the castle.

"That's my old cabin," he said. "I come up here lots of times and cook a meal over my old campfire." At heart Scotty is still the old desert rat. As we approached the castle again, several queer metal contrivances between the doors and windows drew our attention. Back of these were loop-holes which were covered with ornamental metal on the inside. I asked him about them. He walked over to one of the metal coverings and drew it back.

"Suppose you had a machine gun now," he said. "You could shoot against that metal deflector out there and send bullets raining about anybody at the door, anybody that was trying to get in."

Scotty always carries $8,000 to $10,000 in bills, money or express orders on his person. In the early days he was in the habit of having his banks send new supplies of currency to him in uncut sheets of $20 bills. One afternoon Scotty had a sheaf of these sheets in his grip on a trip to Los Angeles. He fell in with a stranger on the train who soon learned he was from Death Valley.

Scotty Is Arrested as Counterfeiter

"Do you know Death Valley Scotty?" the stranger inquired.

"Sure," Scotty said. "I work for him."

"You do!" said the stranger. "Well, where does Scotty get all his money?"

"Don't you know?" Scotty whispered. "Why, he's a counterfeiter. I'm going down to Los Angeles now to put out some of his money."

He reached into his grip, pulled out a pad made up of huge sheets of $20 bills. With a knife he cut one of them off, called the news agent and bought a handful of cigars with the twenty.

"See how easy?" said Scotty. "Here's another pad of $3,000 I'll sell you for $2,000."

When the train pulled into San Bernardino, California, his chance acquaintance disappeared. Scotty stepped into the station restaurant, where the manager was a friend of his, and shoved part of a waffle iron inside his shirt. It wasn't long before government officers boarded the train on the tip of the curious stranger and arrested Scotty, seizing his waffle iron as part of his counterfeiter's equipment.

Jailed for Shooting His Brother

But the laugh was on the officers and on the stranger when Scotty was identified, when the bills were proved to be genuine, and when the waffle iron was recognized as Scotty's last minute contribution to the hoax.

Many men have tried to trail Scotty on his forays into the wind-torn and crater-scarred desert. Those that did follow him, cursed the

(Continued on page 134)

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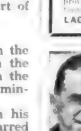

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Scotty—The Desert Mystery Builder

(Continued from page 133)

uncanny ingenuity with which he tricked them from his trail.

A strange escapade, involving an alleged attempt of Eastern interests to cut in on Scotty's widely publicized mine, landed him in jail back in 1906. According to one version Scotty accepted a big stake for an interest in his mine and then scared off the purchasers by an ambush in Wingate Pass which leads into Death Valley. Scotty denies having sold any interest in the mine.

But one thing certain is that Scotty did ambush the cavalcade and put it to ignominious rout and that in the mixup one of his shots seriously wounded his brother, Warner, who was driving one of the wagons. Scotty and his brother are bitter enemies to this day.

San Bernardino newspapers at the time described the attempt of a sheriff's posse to trap the "dangerous Scotty gang" in Death Valley for the shooting. Eventually Scotty was arrested when he appeared in San Francisco and he was thrown in jail in San Bernardino. But when the case came to trial, there arose one of the deepest mysteries of that time—the discovery that Wingate Pass was not in San Bernardino County, that it was five miles over the line and outside the jurisdiction of the court. The "Scott gang" was freed and the case closed.

As we sat talking in the desert castle, Scotty impulsively decided to tell me the whole story.

How Scotty Moved County Line

"I fixed it up to have them ambushed," he said. "I wanted to scare them off. But the shooting was too close and my brother Warner got hit. I came near getting into trouble that time. At the hospital they had saved the bullet that would have linked my Mannlicher rifle to the case. I got myself another bullet, bloodied it up by shooting it into a quarter of beef and then went to see Warner in the hospital. While there I got hold of the real bullet and left the other in its place.

"But that wasn't enough. It looked as though they would hang the thing on me yet, for Warner was plenty sore. I knew the county line ran near there and so I tipped off my lawyer to have them check on what county the pass was in. They went up there with surveyors and found that Wingate Pass wasn't in San Bernardino County.

"And it wasn't, right then. I'd been up there ahead of them and moved the stakes five miles, putting Wingate Pass in Inyo County. Later I moved them back and the pass now is in San Bernardino County where it belongs."

The Desert King's Mysterious Partner

Several years ago during an income tax investigation, Scotty declared his funds came from his partner, A. M. Johnson, a wealthy Chicago insurance man whom Scotty befriended back in 1904. That Johnson is Scotty's partner is certain for the monogram "S and J," meaning Scotty and Johnson, is cast into each of the thousands of ten-foot concrete fence posts that encircle the Death Valley domain.

Nobody knows definitely what is the business

relationship between Johnson and Scotty. It has been suggested that Scotty may have invested some of his early strikes in Johnson's insurance business—getting in return a silent partnership in his future insurance operations in Chicago. Such an arrangement would explain Johnson's enigmatic statement that he is "Scotty's banker."

Capt. Fawcett Explores Secret Tunnels

This is a possible solution of the mystery, although it may not be a true one. But I'll wager it is closer to the truth than the dozens of fantastic yarns that have been written about Scotty and his mine.

The writer thoroughly explored all the tunnels and secret rooms underneath his castle during several days' sojourn at the ranch. When we emerged from the labyrinth of secret passageways beneath the castle, I had seen no gold mine nor any gold, for that matter.

But the Homeric legend of Death Valley Scotty will continue and grow, for in the entire history of the old West, romantic and exciting as it is, there is nothing to compare to this mystery builder of Death Valley.

Celebrate Airplane's 30th Birthday

(Continued from page 55)

True, in some European countries the commercial designs were thinly disguised military types but generally speaking the increasing demands for safety, efficiency and comfort resulted in complete change of policy on the part of the airplane designers. No longer was the passenger's comfort a matter of utter disregard, and the wood and wire creations of war and pre-war days lost all place in the designs of the day.

Steel and metal alloys now came into first place for construction purposes. The all-metal plane became more than a dreamed-of possibility—it became an actual fact and competed more than favorably on a weight and strength basis with conventional type construction.

Great progress was made in the study of aerodynamics and wing sections; control surfaces and their disposition received close attention. The tail wheel, abandoned as long ago as 1914, came into favor again with the wide spread use of wheel brakes. Metal propellers gradually supplanted the wooden clubs of yore. Self-starters were found not only practicable but essential and the cabin type plane, pioneered by Sikorsky and A. V. Roe in pre-war days, was re-introduced to become an immediate success for air line and private use.

Thus today we see the comfortable, spacious, fleet and almost completely fool-proof ships plying their regular routes on the far-flung airways of the world. Noise, the bugbear of early craft, has been reduced to the point where passengers may converse in normal tones with ease.

It is a long way from the early Curtiss pusher, this—when pilot and passenger perched precariously on open seats in front of the wings. A long, long way but we can only guess at what is to come. Nobody but a fool would attempt to

(Continued on page 137)

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30x5.00-20	2.85	1.05
28x5.25-18	2.90	1.15
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30x5.25-20	3.05	1.15
31x5.25-21	3.25	1.15
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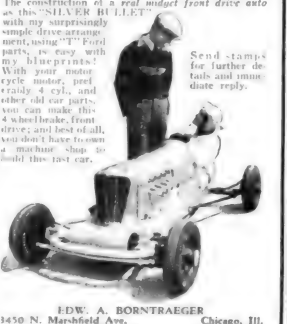

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Study Shooting to Bag More Ducks

(Continued from page 65)

rate of speed, will intercept at a given point. A duck in full flight covers a distance of 60 to 100 feet per second, or a space of about 15 feet from the instant the trigger is pressed to the time the shot is 40 yards from the gun. That will give you an idea of the extent to lead a duck. Practically nine out of every ten misses are due to shots passing back of the flying duck.

Practice Leading for Accuracy

Proficiency in hitting ducks will come with practice and correct leading will become automatic. A barrel head suspended from the limb of a tree and violently set in motion makes a very good target from a distance of 30 or 40 yards. A better target is a life size duck form cut out of light wood. Such a target preferably should be suspended from the limb of a tree on a river bank or lake shore so that the target will be silhouetted against the water. As in actual duck shooting the gun should be brought into line with the flight and even with the target, rather than behind it, thus shortening the swing. A short swing or "lead" tends to improve accuracy. Leading is the bugaboo of the amateur. A slow motioned person will take half a second to get a gun to his shoulder. In that time a teal in full flight will cover forty to fifty feet. It is generally assumed one aims behind the duck and then swings ahead. It is advisable to draw on the duck, swing, and fire instantly.

Judging Speed of Ducks

Good shooting demands good judgment of distance. I am referring now to real duck shooting, river jumping or pass shooting, instead of shooting over decoys, anchored at a known distance. I am considered a fair shot, yet it is difficult to make positive statements concerning marksmanship. As long as I can distinguish the species of the duck, I consider it within range of my 12. If I can see the eye of a duck rising off the water, I do not lead. If the duck has risen off a river bank and is flying at right angles, at good speed, I lead two lengths of the duck. If the duck, flying at right angles, has attained fast speed and is more than thirty yards away, my lead will range from two to six feet. When ducks pass within range at full flight the lead will vary from ten to twenty-five feet. This may seem too much to the amateur, but bear in mind that most misses are the result of not leading enough. At the end of this article tables are given showing the correct ammunition for various fowl and the proper leads for different sizes of shot.

On marshes and big water, ducks are usually shot from a blind or from a boat pulled up into high reeds and grass. In the latter case, the boat should be camouflaged with dead grass, and the hunters should wear clothes of similar color. A blind may be anything located on a flight path or near decoys that will hide the hunter. Whatever is used must be weathered to fool

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Study Shooting to Bag More Ducks

the wariest fowl. Decoys, generally used at blinds, should be set out to the windward and well scattered. Two or three live decoys among a battery of wooden ones will surely bring 'em in. Either a dog or a small boat will be required for retrieving ducks shot from a blind.

River hunting requires more skill and will appeal to sportsmen who dislike tiresome waits in the blind. The river hunter follows the convex banks, keeping close to cover as quietly as possible and ever alert for "jumped" ducks. The real sportsman will pass up ducks that come up at doubtful ranges in the interest of conservation and he never shoots ducks on the water.

Proper 12-gauge ammunition for different fowl follow: Small ducks, teal, pintail, etc., 3½ drams powder, 1⅛ oz. No. 6 shot; mallards, black ducks, canvas backs, 3¾ drams powder, 1⅜ oz. No. 5 shot; and geese, 4 drams powder, 1¾ oz. No. 2 shot.

Tables Show Velocity of Shot

Tables have been devised mathematically to show the velocity of the shot, the time required in reaching the target, the force or energy of the shot when it hits the target, and the lead necessary. Shot must have a striking energy of 1½ lbs. per pellet to insure killing power on a mallard. The table below is for different shot sizes of 1¼ oz. and 3½ drams of powder in a 12-gauge gun at a distance of 40 yards from the target.

Size	Velocity	Time	Lead	Energy
2	1040 ft. p. m.	.1154 min.	6.8 ft.	6.9 lbs.
3	1030 ft. p. m.	.1167 min.	7.0 ft.	5.6 lbs.
4	1012 ft. p. m.	.1176 min.	7.0 ft.	4.0 lbs.
5	995 ft. p. m.	.1206 min.	7.2 ft.	2.9 lbs.
6	970 ft. p. m.	.1237 min.	7.4 ft.	2.1 lbs.
7	950 ft. p. m.	.1263 min.	7.5 ft.	1.4 lbs.

At 50 yards the lead would range from 9.4 feet for No. 2 to 10.6 feet for No. 7, with energy of 5.5 and .9 pounds respectively. At 60 yards it would range from 12.1 to 14.3 feet for No. 2 and 7 with respective energies of 4.1 and .9 pounds. At 70 yards the figures are 15.3 to 18.8 feet from No. 2 to 7 with respective energies of 3.2 to .4 pounds.

Celebrate Airplane's 30th Birthday

(Continued from page 135)

predict what the airplane of the future will look like and it would be equally foolish to assume that design has reached anything like perfection as it stands today.

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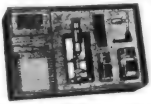

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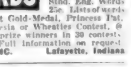

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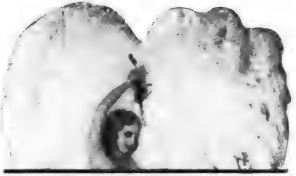

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Fortunes Waiting for Inventors

(Continued from page 105)

weighed by penny-in-the-slot machines he would reap a quick fortune.

Ladies who wear white shoes in the summer time would welcome some sort of a little shoe cleaning device that could be carried in the pocket book and that could be used for the quick removal of spots. The article should sell for 25 cents and the inventor's royalty would reach at least $30,000 a year.

A tricycle for children that could be changed to a bicycle of small size as the child grew older. It would be necessary to remove one wheel and arrange the two remaining wheels in tandem.

A simple little device that will always keep a clothes line taut and at the same tension regardless of the weight of the clothes on the line. The device should be cheap enough to be sold in the five and ten cent stores.

Some method of making the two halves of scissors remain tightly pressed together. At the present time this is done by means of an adjusting screw which, in the case of the cheaper articles, is constantly in need of attention. Perhaps the trick can be done by building a heavy spring into the scissors so that they will remain self-adjusting for their entire life.

A pill bottle with a top so designed that only one pill at a time will come out as the bottle is tipped. The top should be inexpensive enough to be included free of charge with every bottle of pills. It could be made of pressed metal, cast metal (white metal for instance) or some cheap molded product like Bakelite.

A simple vacuum dust pan operating from a simple hand pump. Placed over dirt on the floor it would be necessary only to operate the handle and the dirt would be sucked up into a container without the necessity of the housewife bending over or making four or five efforts to catch the last bit of dust.

An improved method of fastening a door knob to the shaft. The set screws used at the present time become loose and either drop out and are lost or they permit the knob to slip.

A practical design for an all-metal shovel including the handle. Today we have the manufacturing facilities for such an article but as yet no inventor has shown how it might be done in a practical way.

An electric sealing device that can be provided with a stick of sealing wax, plugged into an electric light socket and used repeatedly. Legal and business offices sending a large amount of registered mail would be large users of such an article.

A simple pocket gauge which when held up in the wind will indicate the speed of the wind. Such an article would be valuable to hunters in that it would guide them in regulating windage for their rifles. Such articles would also be widely used in shooting matches.

Mechanics who use pinchers know how painful it is for the pinchers to slip and catch part of the finger or fleshy portion of the hand between the jaws. Many a painful blood blister has been caused in this manner. Why does not some alert inventor design a pair of pinchers so that this disadvantage may be overcome?

An electrically opened garage door working on

Fortunes Waiting for Inventors

the principle of the automatic highway signals that are lighted by the approaching car which passes over a steel plate buried in the highway. The buried switch should require the weight of a car to operate it so that merely stepping on it would not open the doors. Such a system would be far more practical than the radio and photo-electric devices now employed for this purpose.

Cash Prizes for Cigarette Holders

(Continued from page 44)

tal cigarette holder he can imagine. Twelve other entrants will share in the prize money—so there is ample chance for you to win a prize.

As a hint to the type of thing that will stand the best chance of winning, bear in mind that the judges will consider the entries on the following points, in order as named: Originality of conception, practicability (as opposed to the grotesque or distastefully bizarre), workmanship, and lastly, ease of construction.

When you've completed your conception—don't stop at one if you have several ideas—wrap it up securely, address it as directed, and see that it is weighed and the proper amount of postage placed upon it to carry it to the office of the Contest Editor. The rest is up to you and Fate!

No correspondence will be entered into concerning the awards. Checks will be mailed and contest winners notified as soon as the judging has been completed. No holders will be returned.

Which Football System Will Win?

(Continued from page 131)

teams are so much bigger than those of other schools, but it's not true."

Dr. Spears once explained his victories with two words to the writer. They were:

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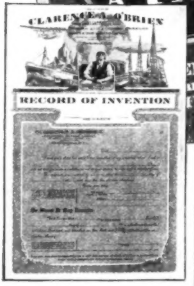

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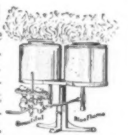

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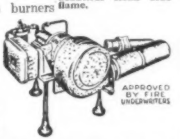

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LIVING YOUTHFULLY

Even After 60

Thousands of Men Prove the Wonders of this New Drugless Gland Stimulant

MANY men have a false notion about the real significance of rejuvenation. This misinformation has been greatly fostered by the distorted newspaper accounts of European gland operations. These spectacular operations are but one aspect of a subject which is of the utmost practical importance to aging men.

Rejuvenation is not merely an attempt to turn back the hands of time. It is not just a whim or vanity that interests men past middle age in the subject of rejuvenation. Few men past the prime of life are interested in rejuvenation simply for the sake of growing younger or prolonging life.

Robust Health . . . Abounding Energy

By far the most important aspect of rejuvenation is health . . . freedom from pain, weakness, debility and certain distress and often painful symptoms so common to old age.

So little is generally known about the subject of glands that it would probably amaze many men to learn that most of their suffering and distress attributed to age is due to the failure of the tiny prostate gland.

Symptoms of Gland Trouble

When this vital gland slows up in men past middle age it often hypertrophies and becomes congested, swollen and greatly increased in size. In this condition it often heats up and presses on the bladder and urethra, thereby causing severe bladder trouble, frequent nightly rising between sheets, and not infrequently, both chronic constipation and hemorrhoids.

Are You Blaming These Troubles on Approaching Age?

Prostate trouble is also the frequent cause of disability, sickness, pains in the back, feet and legs, chronic fatigue, and often a general lack of ambition, a feeling of age, depression and irritability that many people realize how widespread it is. Some medical men believe, however, that fully two-thirds of all men past the age of 50 have some or all of these symptoms of gland disorder. Untold thousands of aging men suffer in this way and do not know the cause. For the most part they blame these troubles on approaching age.

There is no well-known agent which will reduce the swollen prostate gland to normal size. Palliative treatment is by finger massage and physio-therapy methods. When the gland swells beyond the ability of palliative measures to correct, the only alternative is to remove it, which is a serious surgical operation even when would like to avoid.

A Safe Home Method of Natural Stimulation

Now comes a way to stimulate the prostate gland in a safe, natural way. This discovery acts directly to the area of the gland with soothing, medicinal effect of application of electrical heat and greatly increases the circulation. The method is drugless and harmless, involving neither pain, risk, loss of time or embarrassment. It is easy and pleasant to use in the privacy of your own home. It has the enthusiastic and endorsement of men noted physicians. One doctor says of this treatment: "A hundred years ahead of modern medicine," a thousand years ahead of the surgeon's knife."

Thousands of men have already used this remarkable treatment with the most amazing results. In many cases, often where other relief seems almost unreliable. Quick as in response to this treatment. It is by no means merely a temporary relief, but it is designed to relieve the distressing symptoms by correcting the cause.

Feel Ten Years Younger

While it is not claimed that the treatment will actually make you grow younger, the method is so amazingly effective that it is offered under an agreement that unless you feel ten years younger in every way the treatments cost nothing.

Remarkable Book FREE

This new discovery is of such universal and far-reaching importance in the health, activity and robust vigor of men past 40 that it is described in a remarkable 24-page illustrated book, "Why Many Men Are Old at 40."

Mail the Blank Below

If you have this gland trouble or any of the symptoms mentioned, write today for this free book. You can ask yourself certain frank questions that may reveal your true condition. Every man past 40 should take this test, as insidious prostate disorder often leads to surgery. This book is entirely free, but mail the coupon immediately, as the edition is limited. Address

W. J. KIRK, Pres., THE ELECTRO THERMAL CO.
3871 Morris Avenue Steubenville, Ohio

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Please send me, FREE, your 24-page illustrated book, "Why Many Men Are Old at 40," and full particulars of your method.

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